COLONY OF MAURITIUS

Annual Report

OF THE

Department of Agriculture

for the year 1960

[PRICE: R. 1.25]

PRINTED AND PUBLISHED BY
J. ELIEL FÉLIX, I.S.O., GOVERNMENT PRINTER,
PORT LOUIS, MAURITIUS
NOVEMBER 1961

29 JAN 1962

No. 32 of 1961

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Department of Agriculture,
Réduit,
18th May, 1961.

Sir,

I have the honour to submit the Annual Report of the Department of Agriculture for the year 1960.

I have the honour to be,
Sir,
Your obedient servant,
G. A. North Coombes,
Director of Agriculture.

The Honourable the Minister of Agriculture and Natural Resources,
Ministry of Agriculture and Natural Resources,
Port Louis.

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Annual Report of the Department of Agriculture for the year 1960

I. General Review

There has been no important change during 1960 in the policy of the Department of Agriculture. It continues to centre around the maximum utilisation of all agricultural land and the water resources to the best advantage of the people of Mauritius. Closely connected with this objective is the development of the livestock industry as regards the production of milk, meat and and poultry products. In regard to the framing of policy the Ministry of Agriculture and Natural Resources and the Department are assisted in an advisory capacity by the Board of Agriculture, Fisheries and Natural Resources.

2. In order to fulfil the task assigned to it by the Ministry, the Department is organised into 13 divisions employing 272 officers including a Director and two Deputy-Directors who plan and carry out the experimental, development and extension work of the Department.

3. On future policy, the findings of the Commission headed by Professor James E. Meade, which visited Mauritius from the 12th March to the 24th April to report on " The Economic and Social Structure of Mauritius ", will no doubt have an important bearing. Every assistance was given to the Mission by the Department. By the end of the year, the report had not yet been published.

4. Policy cannot be implemented without trained personnel. A primary objective of the Department, therefore, is the maintenance of an adequate technical staff. Nearly all the professional and technical officers of the Department are initially provided by the College of Agriculture which functions as a division of the Department. Specialist staff complete their training overseas. In order to meet the increased demand for trained personnel both in the Department and in the private sector, new schemes of studies were under examination by the Ministry of Agriculture and Natural Resources. The scheme for the diploma course provides for the training of two streams of students, one predominantly in ' General Agriculture ' and the other in ' Sugar Technology '. At the time of writing, the scheme has received Government's approval for early implementation.

5. The staff of the Department has two main lines of work:—

(a) the development of experiment stations for the study of crops and livestock in the various environmental conditions obtaining in Mauritius;

(b) extension work, to give technical assistance to farmers in order to ensure the large scale dissemination and practical application of the information obtained from the experiment stations.

6. During the year under review the Department has maintained the essential services which it continues to provide for the Sugar Industry, namely the Sugar Millers and Planters Central Arbitration and Control Board which regulates the sale and purchase of canes, the College of Agriculture which provides the industry with its cadre of trained staff, and the Extension Service for small sugarcane planters whose main aim is to raise the small planters yields to a figure more comparable with those of estates. The Plant Inspection Service and the ultimate responsibility for Plant Quarantine, including that of the sugarcane, remain the responsibility of the Department although, by mutual agreement with the Mauritius Sugar Industry Research Institute, the latter now maintains and supervises the working of the Cane Quarantine Greenhouse. The Department has worked in close co-operation with the Sugar Insdustry Research Institute and other organisations, and has directed the administration of the Sugar Industry Rehabilitation Funds which include the Pointe aux Sables Cane Nurseries for the production of disease-free planting material for small cane planters and the Small Planters Mechanical Pool.

7. The development of agricultural industries other than sugar has continued to be the Department's major item of policy. No effort has been spared to promote schemes for the encouragement of the production of tea, tobacco, aloe fibre, livestock products and foodcrops.

8. The Tea Industry is now controlled by the Tea Control Board under the Chairmanship of the Director of Agriculture. The implementation of the Tea Development Project was continued concurrently with the reorganisation and rationalisation of the original local industry. Most of the land cleared and planted to tea under the project consists of hitherto unutilised Crown Lands. The land is leased to suitable tenants: approved type seed is supplied by Government without charge, and further assistance is given in the form of various subsidies. This development suffered a major set back from the disastrous effects of the two violent cyclones which struck Mauritius in January and February. In particular it became even more apparent that soil loss was taking place under existing methods of opening up new lands for tea. Steps were taken to alter the methods of land clearing, preparation and lay out, and at the end of the year the services of Mr. R. O. Barnes, a soil conservation engineer, formerly of the Kenya Department of Agriculture, were secured for a short period in an advisory capacity.

9. The New Government Tea Factory at Chartreuse suffered severe damage from the second cyclone and was out of commission for the rest of the year. The reconditioning of the factory was terminated at the end of December; production was scheduled to be resumed after the New Year holidays.

10. The Tobacco Industry is controlled by the Tobacco Board, also under the Chairmanship of the Director of Agriculture. The Department of Agriculture provides research facilities to the industry. The constant endeavour of the Tobacco Board and the Department has been to improve the efficiency

of the industry, to encourage the production of better grades of tobacco and thus to increase the usings of locally produced tobacco by the cigarette manufacturers while not neglecting the possibilities of the export market. The prospects of a regular export market, however, remain discouraging.

The first plantations of tobacco were completely destroyed by the cyclones, but thereafter plantings were very successful, yield and quality being better than in previous years and there was no drop in overall poduction.

11. The aloe fibre industry has continued to pose a difficult problem. Although there exists a demand by the Sugar Industry for sacks made of aloe fibre or a mixture of aloe fibre and jute, the cost of production of such sacks is higher than that of the imported jute sacks so that the necessity for a subsidy for the continued existence of the industry is inescapable. The Department of Agriculture has been actively engaged in doing everything possible to maintain this industry and has made available the services in a part-time capacity of an officer who also acted as Deputy Director during most of the year, for the management of the Government Sack Factory.

Following the cyclones, relief was given to the fibre producers by the Factory in the form of a price increase.

12. The livestock industry has shown encouraging results along the approved lines of development as delineated in subsequent sections of this report. In particular, the Poultry Development Scheme, whereby it is expected to make Mauritius self-sufficing in its requirements of day-old chicks and hatching eggs, began operating on a production scale. The artificial insemination service for cattle was satisfactorily maintained. A quarantine station and corrals were erected at Fort George for all the cattle imported for consumption.

13. Foodcrop production was encouraged especially by the laying out of demonstration plots and by giving technical guidance to the farmers concerned by the Department's Extension Service. A total of 9,450 arpents were grown to foodcrops during the year, giving an overall yield of nearly 50,000 tons.

14. In regard to land settlement the project started at Plaisance in 1959 was completed. On settlement schemes general maintenance works were performed by tenants under the control of departmental officers.

15. The effects of the two cyclones greatly affected the work of the experiment stations. At Richelieu Experiment Station the risk of erosion has now been considerably reduced by appropriate measures. On other stations, sheet erosion was apparent on fields without adequate crop cover. Considering the high rainfall during these cyclones, the effects were not as serious as might have been expected. At Curepipe Experiment Station 24″ of rain fell in two days during cyclone ' *Alix* ' and 27″ in two days during cyclone ' *Carol* '.

16. The detailed experimental programme of work initiated in 1959 was continued, and more formal experiments were planned for 1960. Despite the adverse effects of the cyclones, which destroyed most crop trials, especially those on tobacco, a large part of the year's programme was completed. Two

satisfactory series of investigations concerned the performance under local conditions of better potato varieties, and the testing of introduced grazing and fodder grasses.

17. Work on silage production progressed during the year with the construction of several silos of various types in different locations. Demonstration silos of the pit type were constructed at two of the District Extension Demonstration Plots, and three in villages around the island. This work is being continued. The storage of cane tops by ensilage for feeding the Department's cattle in periods of fodder shortage has now reached the routine stage, but trials to improve existing methods with a view to reducing the cost of production will continue for some time.

18. The sales of vegetable seeds again increased; a drop in the sale of plants was caused by loss of planting material and nursery stocks. The production of vegetable seeds was increased, a larger acreage being available for that purpose during the latter part of the year following the enlargement of Barkly Experiment Station. Seeds were produced on a total acreage of 33 acres at the experiment stations but despite the increased production, the demand for seeds of peas and beans could not be fully met. It is hoped to have the full use of the newly cleared lands at Barkly during 1961, when production will be further stepped up to cope with demand.

19. With effect from the 1st July, the Veterinary Division passed directly under the control of the Ministry, its Animal Husbandry Section being transferred to the Agricultural Division. This change meant that the two Livestock Breeding Stations at Curepipe and Palmar became part of this division. At the same time, all work in hand at the various agricultural stations on poultry became the responsibility of the Livestock Division which was re-styled the Division of Veterinary Services. The main functions of the Animal Husbandry Section are: (i) the breeding, feeding, management and economic aspects of livestock production in Mauritius; (ii) the administration and research work at the two Livestock Breeding Stations; (iii) the formulation of rations for all classes of livestock, produced at the Livestock Feed Factory.

20. Demonstration pens to house Anglo-Nubian bucks and Large White boars were built at Mapou and Rivière des Anguilles Demonstration Centres. The purpose of this is to put at the disposal of the small stock breeder bucks and boars of proven merit. A nominal fee is charged for service.

21. Investigations were carried out on a number of diseases affecting crops other than sugarcane. Diseases occurring on tobacco, tea, potato, maize, onion, garlic, leeks, tomato, ginger, groundnut, beans, peas, pigeon peas, cabbage, carrots, chillies, cucurbits, egg plant, lettuce, banana, citrus and pineapple were investigated.

Tobacco seed disinfection, soil fumigation and disease control in tobacco seed beds by means of patent chemicals have become established practices.

22. The Department continued to control the importation of plant and plant parts under regulations in line with the coordinated legislation under the Inter-African Phyto-Sanitary Convention. A fumigation plant was erected at Port Louis. This consists of two concrete rooms of 40 cubic metres for fumigation at atmospheric pressure. The plant is intended primarily for the fumigation of commercially imported fruit and will be a boon to importers in this field. It is also being successfully used for the disinsectisation of baled tobacco.

23. Breeding of the snail *Euglandina rosea* was developed as it is a promising predator of the Giant African Snail *Achatina fulica,* a destructive pest in particular of many market garden crops.

24. The cyclones already referred to caused a general upset of the insect population of the Island. Some important useful parasites were affected to such an extent that some pests of normally minor importance assumed serious proportions especially in regard to fruit crops.

25. The Agricultural Chemistry Division, apart from miscellaneous analytical work for the public, undertook all the analytical work of the other divisions of the Department in connection with their experimental programme. The main products analysed concerned foodstuffs, silage, fodder, milk and soils.

26. The Engineering Division undertook all departmental cyclone reconstruction work in addition to its current commitments. This put a very heavy load on the Division. This Division also maintained and ran the Livestock Feed Factory at Richelieu and ensured, in close cooperation with the Animal Husbandry Officer (who is responsible for formulations), the preparation of a variety of concentrate feeds for the various classes of livestock reared in Mauritius. The popularity of these products increased markedly in 1960, sales totalling Rs 1,058,317 as compared with Rs 840,169 in 1959 and only Rs 489,746 in 1958.

27. The experimental studies on fish farming were continued. Various trials were conducted to test productivity breeding capacity, mono-sex culture, and fertilizer requirements of ponds. The use of *Tilapia melanopleura* was reduced to 10 per cent of any pond stocked with *Tilapia nilotica* and *Tilapia macrochir,* the main producing species. At this low rate, *Tilapia melanopleura* is useful in keeping the ponds free of water weeds.

28. Oyster culture investigations continued along the lines suggested by Professor Pierre Lubet. At the end of 1960 the string collectors, all densely covered with one-year oysters, were broken up and the oysters distributed for farming. The experimental work continues with the cooperation of a number of oyster producers who have lost no time in adapting the improved methods to their conditions.

29. In Rodrigues, work on the development plan continued on the approved lines. A plan to extend the project to 1965 was prepared. The new plan follows generally the same pattern as the old in providing for the deve-

lopment of unit farms, for rigid soil conservation measures and for protective reafforestation. It also provides for the irrigation of the recently developed river estuaries mainly for the production of rice. Some new features are being included, e.g. the development of small dairy farms, and training schemes for Rodriguan agriculturists. Progress during the year has been very satisfactory, the work being kept to schedule in spite of numerous difficulties.

II. Boards and Committees

30. Departmental officers served on the following boards and committees.

Agricultural College Advisory Board
Board of Examiners of the College of Agriculture
Board of Examiners for the Registration of Agricultural Chemists
Comité de Collaboration Agricole Maurice—Réunion—Madagascar
Customs Tariff Advisory Board
Cyclone and Drought Insurance Board
Fisheries Committee
Irrigation Committee
Land Acquisition Board
Land Settlement Committee
Malaria Advisory Board
Mauritius Sugar Industry Research Institute Executive Board
Mauritius Sugar Industry Research Advisory Committee
Sugar Industry Rehabilitation Fund Committee
Sugar Industry Reserve Fund Committee
Sugar Millers' Rehabilitation Fund Committee
Sugar Planters' Rehabilitation Fund Committee
Tea Control Board
Tobacco Board

III. Board of Agriculture, Fisheries and Natural Resources

31. The Board functions under Ordinance No. 29 of 1957. The following committees were set up by the Board for specific purposes:—

(a) The Fisheries Committee
(b) The Land Settlement Committee
(c) The Irrigation Committee
(d) The Cane Release Committee.

IV. Mauritius Chamber of Agriculture

32. The Chamber of Agriculture continued to play its important role in the agricultural affairs of Mauritius. Its representatives took part in the annual series of meetings between the Commonwealth Sugar Exporters and officials of the Ministry of Agriculture, Fisheries and Food in the United Kingdom in connection with the Commonwealth Sugar Agreement. Developments in regard to the International Sugar Agreement and the sugar world market were also kept under close review by the Chamber. The Chamber appointed the Committee which administers the Sugar Industry Reserve Fund. It also nominated delegates to the following Boards and Committees:—The Customs Tariff

Advisory Board, the Agricultural College Advisory Board, the *Conseil d'Administration de la Revue Agricole,* the Hurricane Loan Board, the Sugar Industry Rehabilitation Fund Committee, the Sugar Millers' Rehabilitation Fund Committee, the Sugar Planters' Rehabilitation Fund Committee, the Electricity Advisory Committee, the Sugar Industry Research Institute Board, the Cyclone and Drought Insurance Fund Board, the Sugar Industry Labour Welfare Fund Committee, the Government Sack Factory Board, the Malaria Advisory Board, the Board of Agriculture Fisheries and Natural Resources, the Cyclone Emergency Committee, the Morris Legacy Fund and the Social Welfare Advisory Committee. The work of the Chamber is fully reported in the President's Annual Report.

V. Comité de Collaboration Agricole Maurice—La Réunion—Madagascar

33. During the year the Committee operated under the Chairmanship of the Director of Agricultural Services of Reunion, with the Director of Agriculture in Madagascar and the Director of Agriculture in Mauritius as Vice-Chairmen.

34. The Committee held its tenth Annual General meeting on the 12th of October at Reunion.

35. Among the visits sponsored by the Committee in the three territories the following were of special interest to Mauritius.

(a) Visit of Mr. Antoine, Phytopathologist of the Mauritius Sugar Industry Research Institute, to study the incidence of the gummosis of sugarcane at La Réunion.

(b) Visit of Mr. Julien, Horticulturist of the Department of Agriculture, to study the methods used in horticulture at La Réunion.

36. The approved programme of work for 1961 includes the survey and continued vigilance of sugarcane diseases in the three territories and visits to sugar factories of La Réunion by the Sugar Technologist of the Mauritius Sugar Industry Research Institute. The next general meeting of the Committee will be held in Mauritius in 1961.

VI. College of Agriculture

37. The College of Agriculture continued to offer a three-year course leading to the Diploma in Agriculture, an eighteen months course for the Certificate in Sugar Analysis and a one-year course in Tropical Agriculture and Cane Cultivation.

38. The teaching of Sugar Technology and Engineering was undertaken, by agreement, by officers of the Sugar Industry Research Institute. The teaching of other applied subjects was undertaken by part-time lecturers, mainly officers of the Department of Agriculture and of the Sugar Industry Research Institute.

Entrance Examinations and Scholarships

39. Forty-seven candidates applied for admission to the Diploma Course and sat for the entrance examination which was held in April. Of these, 20 satisfied the examiners and were admitted as full-time students of the first year of the diploma course. A scholar of the Government of Seychelles was also admitted to follow the course. 42 candidates altogether applied for admission to the Tropical Agriculture and the Sugar Analysis courses. 19 students were finally admitted to the Tropical Agriculture Course and 7 to the Sugar Analysis Course.

Two College entrance scholarships and 1 ' Aimé de Sornay Foundation ' scholarship were awarded.

Student Body

40. The number and distribution of students at the College is tabulated below:—

Course	*1960*	*1959*	*1958*
Diploma	47	52	47
Tropical Agriculture and Cane Cultivation Course ...	19	36	16
Sugar Analysis	7	6	5
Part Time	4	8	3
Total No. of Students ...	77	102	71

41. Attendance at the Sugar Analysis Course, which was started in 1954, continued to be poor, and by the end of the year it had not yet been decided whether the course should be abolished or not.

Visits of Students to Réunion and Madagascar

42. The results of the annual examinations held in April are tabulated below:—

	1960		*1959*	
	Sat	*Passed*	*Sat*	*Passed*
1st Year—Diploma Course	21	12	11	9
2nd Year—Diploma Course	10	8	19	19
3rd Year—Diploma Conrse	19	18	17	17
Certificate in Tropical Agriculture and Cane Cultivation	29	14	7	5
Certificate in Sugar Analysis	5	4	6	6

43. Of the 9 failures in the 1st year examinations, 5 left the College and 4 had to repeat. Of the 2 failures in the 2nd year, 2 had to repeat but one preferred to leave. The only one who failed at the final examinations had to repeat his 3rd year. Out of the 18 successful candidates three qualified for the honours diploma. A laureateship was awarded to the student who came out first, for studies in mechanical engineering.

Visits of Students to Reunion and Madagascar

44. Under the auspices of the *Comité de Collaboration Agricole*, a party of 6 students from Réunion accompanied by 2 lecturers visited Mauritius. A return visit by 6 students of the 3rd year Diploma Course accompanied by the Principal and the Assistant Lecturer in Botany was paid to Réunion during the July vacations.

Prize-Giving

45. The College was honoured by the presence of His Excellency the Governor and the Minister of Agriculture and Natural Resources at the annual prize-giving held on the 17th November. His Excellency the Governor presented the prizes and diplomas, the Minister addressed the assembly as part of the traditional proceedings of this annual event.

VII. Central Board

46. The Central Board operates under the Sale of Canes (Control) Ordinance. The executive machinery of the Board is run as a division of the Department of Agriculture.

Meetings of the Board

47. The Board held 25 meetings during the year, as follows:—

1 meeting relative to the assessment of sugar to planters.
16 meetings relative to the changes of delimitation of factory areas.
6 meetings relative to protests against assessments of sugar.
1 meeting relative to the closing down of weighbridges.
1 meeting relative to general business.

Cane Testing

48. The number of tests carried out was 13,286 covering 223 planters or group of planters and 125 estate sections supplying canes to 22 factories. The corresponding figures for the 1959 crop were 15,893 tests in respect of 213 planters or group of planters and 119 estate sections supplying canes to 23 factories.

Assessment of Sugar

49. Following the publication of figures of provisional assessment of sugar to planters for the 1959 crop, 19 cooperative credit societies, 3 planters' associations and three planters lodged protests against the awards made by the Board. Of these, four protests were withdrawn and the others were rejected.

50. Eighty-eight co-operative credit societies claimed a share in the amount of sugar produced over and above that calculated according to the standards of efficiency adopted by the Central Board. The case was referred to the Ministry of Agriculture and Natural Resources for a decision as to whether the system of cane payment should be revised in this respect. At the end of the year the matter was still under consideration.

Cost of Production

51. Questionnaires were sent to 100 planters selected according to tonnage of canes produced and to 24 millers. All millers submitted figures and their costs of production were worked into individually and by groups arranged according to production. At the end of the year, sufficient information was not yet at hand from planters, large and small, to enable the working out of their costs of production.

Transport Costs

52. The maximum rate claimable by millers for the transport for planters' canes in each factory area from the various weighbridges to factory was fixed by the Board and communicated to the interested parties prior to the beginning of the crop.

The rates were calculated according to the following formulae:—

$C = Rs\ (2.30 + .20\ m)$ for road transport

$C = Rs\ (2.00 + 1.00\ m)$ for rail transport

where ' C ' is the cost of transport per ton of canes, and ' m ' the number of miles over which transport is effected.

Delimitation of Factory Areas

53. Seventy-nine applications for changes of delimination of factory areas were received. Five applications were withdrawn, sixty-seven were not heard as they were considered to be of a frivolous nature. In one case the application was granted. The other applications were rejected.

Permits to Middlemen

54. Fifty-eight permits were issued to middlemen for the crop.

Complaints against Middlemen

55. Forty-five complaints against middlemen were received. In all cases amicable settlements were arrived at.

Cane Contracts

56. Twelve thousand, eight hundred cane contracts were registered. The total number of registered contracts in force in 1960 was 13,300 covering 19,382 planters.

Breach of Sale of Canes (Control) Ordinance

57. Nineteen cases of breach of the Sale of Canes (Control) Ordinance were reported to the Police. Prosecutions were instituted in 15 of these cases.

58. The number of planters who failed to enter into contract before the 30th June totalled 455.

Cane Varieties

59. Two new cane varieties M.202/46 and M.93/48 were authorised for planting. A third variety, M.253/48, was authorised for planting in sub-humid irrigated areas only subject to permits delivered by the Central Board. The other varieties authorised for planting under Proclamation No. 5 of 1956 are:—

M 134/32 (together with its white and striped sports), M 112/34, Ebene 1/37, BH 12/12, B 3337, B 37161, B 37172, M 147/44, B 34104, M 31/45.

Control of Cane Weighbridges

60. The number of cane weighbridges was 129 as compared with 133 in 1959, four having been closed down with the Board's approval.

61. Of this total, 119 were found to be accurate on first examination and the others had to be re-examined, but none required to be condemned.

Surprise Checks carried out at Weighbridges during the crop

62. During the crop 196 surprise checks were carried out and 174 vehicles were reweighed (66 carts and 108 lorries). In 4 cases the weights were found to be inaccurate and the weighers were prosecuted for inaccurate weighing.

VIII. The Mauritius Sugar Industry Research Institute

63. The work of the Mauritius Sugar Industry Research Institute is fully reported in the Annual Report of the Institute.

64. The production of new sugarcane varieties remains the most important endeavour of the Institute. The policy is to widen the range of present varieties, increase the number of crosses made annually and test the largest possible number of seedlings under the two main environments under which sugarcane is cultivated in Mauritius. Studies are also in progress to arrive at a better understanding of the laws governing inheritance of desirable characters in sugarcane.

65. During the year 35 varieties were selected from first selection trials and 103 varieties were in replicated trials on estates, 51 varieties were imported from the U.S. Mainland, Hawaii, the West Indies, Queensland, South Africa and India. Cuttings of several varieties were exported to Australia, India and Madagascar.

66. Research was carried out on fertilizer problems. One of the conclusions of the Director of the Institute in reviewing this work is that ' it is difficult to ascertain accurately how much extra cane would be available if all the cane lands of Mauritius were fertilized correctly, but there can be no doubt that it would be a very large amount indeed, considering that yields can be doubted on many deficient fields by addition of potash and phosphate.' Work on the Soil Survey of Mauritius is progressing and publication of the first stage of the survey is expected during 1961. In the field of sugarcane diseases investigations covered gummosis, leaf scald, red rot, chlorotic streak, Pokkah-boeng and Fiji disease. The report of the Institute also covers research on matters relating to cane pests, weed control, cultivation and irrigation problems. A section of the report is devoted to various studies in sugar manufacture.

67. The cane quarantine greenhouse was badly damaged by the cyclones and 9 cane varieties imported in 1958 had to be destroyed.

IX. The Sugar Industry

Crop Results

68. The total area under cane was 197,000 arpents of which 186,000 arpents were reaped, compared with 195,307 arpents and 183,117 arpents respectively for 1959.

69. Extensive damage was caused to cane plantations by the two intense cyclones of January and February. The production of sugar was reduced from 580,372 metric tons in 1959 to 235,578 metric tons. The yield of sugar per arpent fell from 3.17 metric tons in 1959 to 1.25 metric tons, which is even lower than 1.28 metric tons, the figure for 1945, another year during which the island was visited by two disastrous cyclones.

70 The average crushing rate of sugar factories was 77.0 metric tons per hour compared with 87.7 metric tons in 1959, and the average daily crushing rate was 1,149 metric tons compared with 1,797 metric tons in 1959.

71. The losses to the sugar industry caused by the two cyclones were to a considerable extent alleviated by the compensations paid by the Cyclone and Drought Insurance Fund. In addition to an amount of 34 million rupees which had been re-insured, it is estimated that the Fund will have to provide 96 million rupees to meet total compensation to be paid out.

The Sugar Industry Rehabilitation Funds

72. The Director of Agriculture was Chairman of the Committees administering the Sugar Industry Rehabilitation Fund, the Sugar Millers Rehabilitation Fund and the Sugar Planters Rehabilitation Fund. This latter Fund continued to manage the Small Planters Mechanical Pool and the Cane Nursery at Pointe aux Sables which supplies disease-free planting material and cuttings of newly released varieties to small planters.

Cane Varieties

73. The variety M.134/32 which was at one time predominant continued to recede, being gradually replaced by M. 147/44 and B. 37172 in dry areas and Ebene 1/37 and B. 3337 in humid areas. The varieties which showed the best resistance to cyclonic conditions were M. 147/44 and B. 37172; the worst was Ebene 1/37, whilst the resistance of M. 134/32 was about average.

Quotas and Prices

74. The negotiated price quota for the calendar year 1960 under the Commonwealth Sugar Agreement was 353,425 long tons and the price £44-8s-10d. per ton. The whole of the 1960 exports, 315,101 long tons, were made against this quota, of which they fell short in spite of a left-over balance of 111,951 long tons from the 1959 sugars.

Local consumption amounted to 26,556 long tons, including 1,099 long tons sold to Seychelles.

Sugar Exports

75. The exports of sugar were as follows:—

Destination	*Long Tons*
United Kingdom	284,489
Canada	24,890
Nyasaland	2,630
Singapore	900
Malaya	1,000
Lebanon	1,192
Total ...	315,101

Molasses and Alcohol

76. The production of molasses amounted to 73,073 metric tons of which 45,180 were exported. About 9,000 tons were used in the manufacture of rum and various other alcoholic products and the balance as fertilizer to the cane fields. The total production of alcohol reduced to 100°G.L. was about 1,900,000 litres, the greater part of it being used locally as rum, denatured spirits, power alcohol and in the manufacture of vinegar. Only about 24,000 litres were exported.

X. Tea Industry

Tea Control Board

77. The Tea Control Board, an executive body in which is now vested the control over the Colony's tea industry, was set up under the provisions of the Tea Industry Control Ordinance, 1959. It replaces the former ' Tea Committee ', which was only an advisory body. Regulations were framed for the enforcement of the Control Ordinance and are now under examination by the Ministry of Agriculture and Natural Resources.

The Board met for the first time in March and held 12 meetings during the year.

Legislation

78. Proclamation No. 2 of 1960 dated 11th February, 1960 fixed the day for the coming into force of the Tea Industry Control Ordinance, 1959 (Ordinance No. 29 of 1959) as the 15th February, 1960.

79. Government Notice No. 4 of 1960, made by the Governor in Council under section 7(2) of the Minimum Wages Ordinance 1950, and cited as the Wages Regulation (Workers in the Tea Industry) Order 1960, setting out the minimum rates of pay applicable to the various categories of workers in the tea industry, was promulgated early in the year.

80. Government Notices Nos. 7 and 77 of 1960, cited as the Tea Industry Control (Sale of Leaves) (Amendment No. 2) Regulations 1959 and the Tea Industry Control (Sale of Leaves) (Amendment) Regulations 1960 respectively, both making minor amendments to the Tea Industry Control (Sale of Leaves) Regulations 1959, were also enacted.

Cyclone Damage

81. The overall loss of crop for the year as compared with the previous year's production was estimated at 17 per cent for the whole island. Young tea below $3\frac{1}{2}$ years suffered severe damage from the cyclones, the loss of bushes being estimated at 30 per cent. Mature bushes stood up remarkably well, complete destruction being virtually negligible.

Managing Agency

82. The Nuwara Eliya Tea Estate Company (Mauritius) Limited continued to operate as Government's Managing Agents in respect of the 500—acre Midlands Tea Estate and ' Chartreuse ' Factory. This factory suffered severe damage from cyclones ' *Alix* ' and ' *Carol* ' and was out of operation for the greater part of the year.

Repairs were completed at the end of December, and manufacture was scheduled to recommence in January, 1961.

83. The Midlands Tea Estate in common with all the other tea properties suffered from the effects of the cyclones, the yield from the mature areas of tea being considerably reduced.

84. Following the cyclones, the winter months were very favourable to planting, enabling successful rehabilitation of some of the devastated areas. The months of October/November were unusually cold and wet with the result that the crop during the latter part of the year was not as good as could have been expected.

Factories

85. Apart from Chartreuse, Nouvelle France Factory built mainly of wood and in poor condition, suffered serious damage from the cyclones. The other four factories escaped serious structural damage, but all suffered to some degree from flooding and loss of tea stocks. All were out of action for a few weeks owing to the interruption of the electricity supply.

Mauritian Teas

86. Although production was below last year's figure, it was still considerably above local requirements, and approximately half the crop was exported. The price of tea on the world market remained fairly steady throughout the year at a little above the previous year's prices. Mauritian offerings on the London Auctions were 1,000 chests below the 1959 figure, and on the average sold for $\frac{1}{2}$d per pound less than in 1959. Very little tea was offered this year on the Nairobi Auctions, but the sale of tea for export by private treaty continued.

87. Four thousand three hundred and forty-five packages (108 lb net per package) of Mauritian tea were sold on the London Auctions at an average price of 3s 10.80d per pound as compared with 5,289 packages at an average price of 3s 11.43d in 1959.

Development Project

88. The Tea Development Project which is being undertaken concurrently with the re-organisation and rationalisation of the original small local industry, is in the form of a Government-sponsored pilot scheme designed to put 3,000 acres of new land under tea (together with proportionate manufacturing capacity) by mid-1962. Most of the land employed for the purpose of this initial expansion consists of Crown Land leased in varying seized blocks to selected applicants. These new tenant planters are largely inexperienced in tea planting, and they are provided with all the help and guidance possible. Approved type seed is supplied by Government free of charge, and assistance in other ways is also given.

89. The project suffered severely from the cyclones, some 30 per cent of all the areas planted under the scheme being destroyed. As a result of this destruction and the need for rehabilitation works to be undertaken very little new clearing or planting has been done during the year. By the end of the year it was estimated that approximately 1,600 acres of new land had been cleared and mostly planted since the inception of the project.

90. In order to assist the Project planters to rehabilitate their holdings after the cyclones, Government instituted an aid programme providing for the stabilisation of all main drainage courses in the leased areas, the establishment of tea nurseries to provide replacement plants, the subsequent replanting of the vacancies, and a special cyclone rehabilitation cash subsidy of Rs 100 for each acre of tea under two years old and Rs 50 for each acre of tea over two years old planted under the Project.

91. By the end of the year drainage works had been practically completed on the whole of the leased areas, some 14 acres of tea nurseries had been established, and work had started on the replacement of the destroyed bushes.

92. The 400 acres of Crown land being planted by Government for subsequent piecemeal distribution on lease to small planters when the tea is well established and over three years of age, suffered damage similar to the rest of the Project. Rehabilitation works have been undertaken and by the end of the year 150 acres of new clearing had been completed.

Tea Seed

93. Some 30,650 pounds of first grade tea seed of approved types were imported by air from East African sources. This was considerably more than in previous years on account of the total loss of local supplies due to the cyclones and the need for extra seed for the rehabilitation of the plantations. Normal air services continued to be used for this purpose but, in addition, because of the large quantities of seed being imported, two special charter flights were arranged to lift 6 and 7 tons of seed respectively.

94. As mentioned above all the local crop of tea seed was destroyed by the cyclones which came just before the seed was ripe. In addition, all the blossom on the trees was destroyed and no seed harvest can be expected in 1961. Fortunately, the seed bearers are making a surprisingly good recovery.

95. The young seed gardens at Ajudah and Salazie also suffered some ill effects from the cyclones although not to as great an extent as some other areas of tea. They have recovered well and show promise of becoming valuable additional sources of seed in future years.

Tea Experimental Station—Wooton

96. The Wooton Station—with an area now in bearing of almost 70 acres yielded 169,605 lb of green leaf during the crop year 1959–60 (July to June). This represents a decrease of 93,259 lb from last year's crop. This decrease was mainly attributed to the cyclones, the comparative crop for the months of January, February and March 1959 and 1960 being:—

	January *lb*	*February* *lb*	*March* *lb*	*Total* *lb*
1959 ...	62,731	42,357	35,953	141.041
1960 ...	26,489	26,121	4,995	57,605
Difference ...	36,242	16,236	30,958	83,436

97. Very few mature tea bushes were destroyed by the cyclones, but the shade trees planted amongst the tea were very badly damaged, 80 per cent of the *Grevillea robusta* being uprooted.

98. The vegetative propagation of tea also suffered a setback, as both the propagation nursery at Wooton and the mist propagator installation at Barkly Gardens were destroyed. The mist propagator began operations again in July and has since given good results with the first large scale attempts to propagate tea cuttings in it. Crop and quality tests for the season 1959–60 had to be abandoned after the cyclones. These have, however, been restarted and provided there is no cyclone in 1961 should give some useful much-needed data on the potentialities of the parent bushes.

Production

99. Mauritius produced 1,732,875 pounds of black tea in 1960. No green Tea has been manufactured since 1956. The output per factory was as follows:

Production of the six factories during the last five years in pounds

	1956	*1957*	*1958*	*1959*	*1960*
Bois Chéri	694,399	906,248	651,560	654,545	563,408
La Flora	319,022	424,381	580,313	502,258	527,050
Usine Corson	345,444	327,740	309,086	332,523	282,040
Pont Colville	139,465.7	150,273	174,079	128,374	116,141
Nouvelle France ...	39,264.5	85.110	209,620	268,582	188,127
Chartreuse	—	—	—	110,821	56,109
	1,537,595.2	1,893,752	1,924,658	1,997,103	1,732,875

Exports

100. Tea was exported as follows:—

Destination	*1960*	*1959*	*1958*
	lb	*lb*	*lb*
United Kingdom	445,949	815,596	712,318
South Africa	10,505	112,832	28,572
New Zealand and Australia ...	—	—	25,052
Other Commonwealth Countries	—	—	499
Madagascar and Reunion ...	2,156	3,471	1,258
Western Europe	5,920	42,171	6,292
U. S. America	—	49,401	—
TOTAL EXPORT	464,530	1,023,471	773,991

101. Imports of tea were as follows:—

	1960	*1959*	*1958*
	lb	*lb*	*lb*
China	7,781	6,163	4,580
Hong Kong	2,891	4,229	4,358
Ceylon	8,507	8,050	3,122
India	744	3,740	—
Other Countries ...	297	22	99
TOTAL IMPORTS ...	20,220	22,204	12,159

XI. Fibre Industry

Prices

102. The contract prices of fibre remained unchanged during the year. Owing to the cyclone effects it became apparent that unless relief was given to producers, they would not be able to provide the factory with even a limited supply of fibre. Furthermore, as the leaves had been heavily lacerated, production was bound to be mostly in the lower grades. It was therefore decided to pay at the average rate of Rs 1,050 per metric ton irrespective of grade. This arrangement allowed producers to repair their installations, which had been badly damaged, and to resume production.

103. Notwithstanding this assistance, local supplies of fibre did not suffice for the Sack Factory requirements, and jute cuttings had to be imported to the extent of 423 metric tons to supplement this short fall. The price of reinforced aloe fibre sacks to the Sugar Millers was Rs 1.34 per unit compared with Rs 1.27 for 1959 and Rs 1.45 for 1958.

Average Prices of Fibre per Metric Ton (all grades)

1955	*1956*	*1957–59*	*1960*
Rs	Rs	Rs	Rs
1,001	820	834	1,050

Fibre Production

104. Comparative statistics in regard to the fibre industry are tabulated below:—

	1958	*1959*	*1960*
No. of factories operating	21	20	17
Fibre produced (tons)	1,576	1,465	1,150
Value of local sales (Rs.)	1,553,000	1,403,000	1,018,000
Area under Aloe (Arpents)			
(i) Wild	6,101	6,354	6,354
(ii) Regular plantations ...	839	888	888

There were no exports during the year, the Government Sack Factory being the sole purchaser of all the fibre produced since 1957.

105. Three fibre factories closed down during the year, continuing the trend towards centralisation and the disappearance of marginal producers.

Sack Factory

106. Production figures of the Sack Factory were as follows:—

	1958	*1959*	*1960*
Aloe fibre processed (Metric tons) ...	1,570	1,267	1,155
Jute processed (Metric tons) ...	—	—	360
Sacks produced	1,423,000	1,201,000	1,270,000
Filter cloth (yards)	25,000	28,000	34,000
Other fabrics (yards)	2,000	1,300	19,000
Yarn for ropes (kilos)	13,700	15,300	21,000

107. In 1960, as a new departure, 800,000 sacks of a mixture of local fibre and jute cuttings were manufactured for export to Burma. These sacks will be used for the bagging of the rice imported into Mauritius. The sacks were sold at Rs 1.45 per unit cost and freight.

108. The loss for the year amounted to Rs 422,000 (as estimated in January, 1961 by the Supervisory Accountants), compared with Rs 389,000 for the previous year.

XII. Tobacco Industry

109. Production of cured tobacco was limited to the estimated requirements of local cigarette manufacturers, the British-American Tobacco Co. (Mtius.) Ltd., and the Amalgamated Tobacco Corporation (Mtius.) Ltd.— there being no export market.

Crop Conditions

110. The first plantations of Virginian varieties made at the beginning of the year were completely destroyed by cyclone ' Carol ' which also washed away the majority of the seed-beds.

Plantings of the three types of tobacco, Virginian flue-cured, Amarello flue-cured and Amarello aircured, made thereafter were very successful except in some of the drier localities. The yield was higher than in previous years and the leaf produced was of better quality. The incidence of leaf spots, ' frog-eye ' and ' Alternaria ' was low.

111. Rot diseases were somewhat severe in some localities particularly on the Amarello variety.

112. Insect pests were predominant after the cyclone, at the beginning of the year, as most of the natural parasites of these insects had been destroyed. This incidence of infestation gradually diminished, and by the middle of the crop the position was well under control.

Issue of Permits

113. The following table compares the issue of permits in 1960 with that of the previous year.

	1959		1960	
	Arpents	*Kilos*	*Arpents*	*Kilos*
Flue-cured Virginian ...	738.26	300,000	699.63	250,000
Flue-cured Amarello ...	138.83	130,000	127.02	120,000
Air-cured Amarello ...	164.34	140,000	134.73	115,000
TOTAL	1,041.43	570,000	961.38	485,000

Fewer permits were issued in 1960 than in 1959 owing to an accumulation of stocks.

Production

114. The actual production is shown below in comparison with the 1959 figures.

	1959		1960	
	Arpents	*Kilos*	*Arpents*	*Kilos*
Virginian flue-cured... ...	724	296,174	672	264,480
Amarello flue-cured... ...	143	125,075	127	122,628
Amarello air-cured	162	145,691	132	166,165
TOTAL ...	1,029	566,940	931	553,273

Yields and Returns

115. The yield of leaf and the financial return to growers were higher than in 1959, the prices having remained unaltered.

	Average yield per arpent	
	1959	*1960*
	Kgs.	*Kgs.*
Virginian flue-cured	409	393
Amarello flue-cured	875	967
Amarello air-cured	899	1,258
	Average return per arpent	
	1959	*1960*
	Rs	*Rs*
Virginian flue-cured	2,492	2,760
Amarello flue-cured	4,542	5,686
Amarello air-cured	2,085	3,222
	Average value per kilo	
	1959	*1960*
	Rs	*Rs*
Virginian flue-cured	6.09	7.01
Amarello flue-cured	5.19	5.88
Amarello air-cured	2.32	2.56

Quality

116. The quality of the tobacco produced was higher than in previous years owing mainly to the favourable climatic conditions which prevailed after the cyclones.

	Percentage of Bright and Medium Grades				
	1956	*1957*	*1958*	*1959*	*1960*
Flue-cured ...	69	73	78	75	85
Air-cured ...	16	21	25	10	34

Local Manufacture

117. The Manufacturers' purchases and usings of domestic leaf and imported leaf were as follows:—

1960 Purchases	*Kilos Domestic*	*Kilos Imported*	*Kilos Total*	*% Total Imported*	*C.I.F. Value per kilo*	
					Imported	*Domestic*
					Rs	Rs
B.A.T. Co. (Mtius.) Ltd. ...	469,907	151,044			10.04	6.06
A.T. Cprn. (Mtius.) Ltd. ...	62,828					7.92
Total	532,735	151,044	683,779	22.1	10.04	6.28

1960 Usings	*Kilos Domestic*	*Kilos Imported*	*Kilos Total*	*% Total Imported*	*C.I.F. Value per kilo*	
					Imported	*Domestic*
B.A.T. Co. (Mtius.) Ltd. ...	455,976	104,504	560,480	18.6	—	—
A.T. Cprn. (Mtius.) Ltd. ...	3,787.5	40,549	44,336.5	91.4	—	—
Total	459,763.5	145,053	604,816.5	23.9	—	—

1959	*Kilos Domestic*	*Kilos Imported*	*Kilos Total*	*% Total Imported*	*C.I.F. Value per kilo*	
					Imported	*Domestic*
Purchases	581,938	123,193	705,131	17.5	10.28	5.79
Usings	462,899.5	106,185.5	569,185	18.6	—	—

118. The percentage of imported leaf used in the manufacture of cigarettes has continued to increase as shown by the following figures:—

1956	*1957*	*1958*	*1959*	*1960*
22.8	18.8	15.8	18.6	23.9

119. These figures clearly indicate that the Tobacco Board's policy of encouraging the production of better quality Virginian flue-cured tobacco to replace as much as possible the imports of cigarettes and leaf tobacco has been nullified. This arose from the Manufacturers' decision to import leaf tobacco for the manufacture from 100 per cent imported leaf of two brands of cigarettes previously imported. The adjustment of import duties on leaf and cigarettes and of excise duty on domestic leaf is therefore under study. The average C.I.F. value of Rs 10.04 per kilo for imported Virginian leaf compares with Rs 7.58 per kilo for domestic Virginian. The average values of Amarello flue-cured and air-cured purchased by the Manufacturers were Rs 6.58 and Rs 3.12.6 per kilo respectively.

120. Domestic Virginian, blended with imported leaf, is used in the manufacture of the *' Embassy '*, *' Soirée '*, *' Domino '* and *' Cabaret '* brands of cigarettes which sell in competition with local cigarettes manufactured entirely from imported leaf, namely *' Matinée '* and *' Mills '*, and imported Virginian cigarettes.

121. Amarello leaf and some of the lower grades of domestic Virginian are utilised for the cheaper brands, selling below the price range of imported cigarettes.

IMPORTS

122. Imports of unmanufactured leaf and cigarettes for the last two years are tabulated below:—

	1959		*1960*	
	Kilos	*Value* Rs.	*Kilos*	*Value* Rs.
Cigarettes	46,110	892,701	20,205	418,721
Leaf :—				
Rhodesia	29,896	286,233	57,644	520,592
U.S.A.	91,079	965,150	90,780	981,806
India	2,218	13,791	2,195	12,231
Other sources ...	—	—	425	2,347
TOTAL LEAF ...	123,193	1,265,174	151,044	1,516,976
GRAND TOTAL ...	169,303	2,157,875	171,249	1,935,697

123. The usings of domestic leaf have decreased by Ks 3,136 as compared with 1959, while usings of imported leaf have increased by Ks 38,867.5 during the same period.

124. The Customs and Excise duties were revised as from the 12th April and though the full effects of these changes have not yet been felt, it is clear from the figures at paragraphs 122 and 123 above, that imported leaf is replacing imported cigarettes to a greater extent than domestic leaf.

EXPORTS

125. Prospects of a regular export market remain discouraging.

WAREHOUSE

126. The roof of the Warehouse suffered damage from both cyclones. Repairs and replacements were effected and the trusses were reinforced. This damage to the Warehouse caused a loss of 6,059 kilos of leaf.

XIII. Foodcrops

127. The following tables have been prepared from data collected by the Agricultural Extension Service :—

	Maize	*Manioc*	*Aroumilles*	*Sweet Potatoes*	*Ground Nuts*	*Irish Potatoes*	*Beans and Peas*	*Pineapple*	*Brinjal*	*Tomatoes*	*Ginger*	*Creepers*	*Mixed Vegetables*	*Total*
Area Harvested (Arpents) 1960														
1959	908	86	99	218	289	1,117	1,163	135	716	2,321	97	753	1,875	9,777
1960	536	100	149	232	464	836	989	159	507	2,724	13	1,029	1,712	9,450
Estimated Average Yield (Kilos/Arpent)														
1959	600	5,000	4,000	3,500	750	4,300	850	6,000	5,000	4,000	8,000	15,000	10,000	—
1960	529	4,000	3,126	2,868	1,003	4,356	1,312	4,320	3,000	2,241	3,000	12,000	12,000	—
Estimated Total Production (Metric Tons)														
1959	545	430	396	763	217	4,803	989	810	3,580	9,281	776	11,295	18,750	52,635
1960	284	400	466	664	465	3,639	1,287	684	1,521	6,084	39	12,448	20,544	49,525

The area shown above is effective acreage and includes the aggregate acreages of different crops grown on the same land in one year, as well as foodcrops interplanted in sugar cane.

XIV. Livestock Division

128. As from the 1st of June the Livestock Breeding Centres at Curepipe and Palmar were placed under the charge of the Agricultural Division. In October the two small Poultry Units of Richelieu and Curepipe were placed under the technical control of the Livestock Division. This Division retained the Poultry Breeding Centre at Réduit, the maintenance of the artificial insemination service for cattle and the general supervision and control of animal health in the Island, as well as other auxiliary services.

129. The investigation of animal diseases continued, as well as the control of slaughter houses and the slaughter of milk cattle. In addition assistance to the Police Force was provided in tracking down illegal slaughter and in the prevention of cruelty to animals. Finally, to prevent the introduction of animal diseases, the Division continued its routine supervision of the imports of all livestock and livestock products.

Stock Farm, Réduit

Artificial Insemination Centre

130. The Artificial Insemination Centre continued in operation as in the previous year. The buildings were repaired after the cyclones by the Agricultural Engineering Division.

Poultry Breeding Centre

131. The objects of this project are to provide a source of pedigree day-old chicks and hatching eggs at a price within the means of an average citizen, thereby cutting down imports, and to study and demonstrate modern methods of poultry management. It is not the purpose of the unit to set up as a commercial enterprise, but to provide an active incentive to the development of the poultry industry in Mauritius.

132. The Unit consists of a main building which houses offices, the incubator hall, sexing room, egg sorting and egg storage room, 10 brooder pens, 10 growers pens with sun parlour, a feed store and a wash room. There are also in close proximity 40 breeding pens with alternate runs and a deep litter house capable of housing 400–500 adult birds. The equipment includes three 2,000-egg incubators.

133. The Unit started to function early in 1960.

134. During the year, progeny testing was carried out with a view to selecting the best dams and sires out of the pedigree White Leghorns and Rhode Island Reds imported from the United Kingdom and Australia.

135. Some 4,500 chicks were hatched for progeny testing purposes. The average fertility and hatchability of the eggs were excellent, being 93 per cent and 71 per cent respectively. All the chicks have been banded to their dams and the laying performance of every layer was recorded. Though the Unit will only start to fulfil its main objective, namely the production of pedigree day old chicks, in March 1961, it has already begun to help poultry breeders by supplying some 6,000 hatching eggs besides putting on the market 45,000 table eggs and over 3,000 lb of poultry meat.

136. Besides breeding, the Unit also carried out experimental work with a view to improving the housing, feed and management of poultry under local conditions.

Livestock Extension Service

137. A third Extension Sub-Office at Arsenal, Pamplemousses, was completed during the year.

138. Eight thousand seven hundred and ninety-two cows were inseminated as compared with 8,034 in 1959.

139. In addition 1,404 cases of assessments for pregnancy, 216 cases of enucleation of ovarian cysts; 354 cases of difficult calving; 647 cases of nutritional deficiency complex; 673 cases of digestive disorder; 310 cases of mastitis and 1,566 cases of miscellaneous nature were dealt with by the Extension Staff.

140. The Extension Staff also gave advice to breeders on improved methods of management. The campaign to induce cow keepers to feed concentrates to their cows in the form of cubes as manufactured by the Livestock Feed Factory, has resulted in an appreciable drop in the number of nutritional deficiency complex, 647 cows having suffered from that deficiency in 1960 as against an average of 900 the previous years.

ANIMAL HEALTH LABORATORY

141. Four hundred and eighty-five thousand two hundred doses of Newcastle disease vaccine (live virus) and 46,880 doses (inactivated formalized), were prepared; 108,500 doses of fowl pox vaccine were issued to poultry breeders. 600 cases of canine distemper vaccine, 50 doses of feline distemper vaccine (Panleucopenia), 4,000 doses of swine fever vaccine and 50 doses of bovine wart vaccine were prepared and issued.

142. The incidence of disease in poultry in order of importance were: respiratory disease, coccidosis, nutritonal disease, and leukosis complex.

143. Routine examinations included 1,656 postmortems on poultry, turkeys, pigeons, ducks and other birds, goats, sheep, pigs, dogs and cats.

144. No significant difference in virulence could be found between the St. Antoine and other local strain of mycobacterium tuberculosis.

145. Work was carried out to elucidate the cause of a epizootic affecting goats which caused severe losses in the goat population. The disease was found to be of a non-infectious nature. The animals suffered from severe anaemia figures as low as 7 and 9 mm for the packed cells volume (Wintrobe method). 20 and 24 per cent haemoglobin and 3.2 and 3.5 million red blood corpuscles being recorded. Traces of cobalt and copper given once weekly brought the figures gradually to normal levels. Cobalt or copper alone did not relieve the affection completely.

146. A similar ailment affecting the cattle population was studied. Animals had died so suddenly that cattle owners strongly suspected poisoning. Clinical, post-mortem, and laboratory examinations did not reveal such a possibility. The blanched mucous membranes however pointed to severe anaemia

which was confirmed by laboratory tests. Injection of vitamin B.12 brought about dramatic recoveries of moribond animals. As in goats the blood values were very low. Figures of 13 and 16 mm for the packed cells volume (Wintrobe method) 24 and 29 per cent haemoglobin and 2.5 and 2.8 million red blood corpuscles were recorded. Traces of cobalt and copper given once weekly relieved the animals from this condition and brought the blood values to normal.

147. Pig breeders also reported a number of deaths after a disease of short duration. Again the disease was found to be of a non-infectious nature. Laboratory tests and investigation on the spot of their feeds by officers of the Veterinary Division pointed to the affection being due to malnutrition. Animals in which the affection had not progressed too far responded well to injections of Vitamin B_1 and B_{12} and a change to a richer and more appropriate diet.

148. Outbreaks of xerophthalmia in goats occurred in some localities. No specific agent was found to be the cause of the affection which was successfully treated by vitamin A injections.

149. A survey to detect cases of contagious abortion in cattle at Government institutions and outside, using the milk ring test with stained Brucella abortus antigen, yielded negative results.

150. A few cases of feline distemper were recorded; the two types were encountered, i.e. the bronchial type or true distemper and the enteric type or panleucopenia.

151. An ointment vaccine prepared with *Streptococcus agalactiae* and other organisms isolated from the milk of cows at the Cattle Breeding Centres and applied *in vaginam* at monthly intervals showed an incidence of 20 per cent for the treated animals as against 38.5 for another group where the vaccine was rubbed on the udder, and 46.1 per cent and 33.3 per cent respectively in two untreated (control) groups.

Bovine Tuberculosis

152. During the year, 992 herd cattle and 392 dairy cattle were tuberculin tested, with 8.4 per cent and 1.5 per cent reactors respectively. The reactors were sent for slaughter.

153. Government Stocks at the Livestock Breeding Centres were also tested with negative results.

XV. Land Settlement

154. The Land Settlement Committee held five meetings during the year and examined various matters pertaining to conditions of tenure and selection of new tenants. 256 tenants were settled during the year.

155. General maintenance works were performed by the tenants under the control and guidance of the Agricultural Officer in charge of Settlements. Emphasis was laid on the need to protect the land against erosion.

156. The standard of crop husbandry on the settlements has been satisfactory; the tenants made a good job after the cyclone. Most of the unsatisfactory tenants have been replaced by new farmers. Rent collection has been unsatisfactory for the calendar year and at the same time payment of rent for period ending 31.12.59 was slow. With a view to helping the tenants in the difficulties they experienced after the cyclones, it has been decided that rent for 1960 would be payable in equal half yearly instalments over the next five years.

157. Most of the houses on the settlements have been either seriously damaged or totally destroyed by the cyclones, so that a number of tenants have not resided on their plots for the greater part of the year.

158. The distribution of irrigation water which in certain places was causing difficulties was attended to. Sluice gates and distributory reservoirs have been constructed and the distributory net work extended.

Extension of Settlement Schemes

The Vale

159. This settlement suffered very severely during the cyclones, most of the coconut trees were blown down.

Palmar

160. The clearing of the 180 acres set apart for the extension of this settlement has been completed. Works were delayed by the cyclones and also owing to breakdowns of the mechanical equipment which was working under difficult conditions. Eighty-seven tenants have been settled on holdings of an average size of two arpents each.

Bee Manique

161. Sixty tenants were allotted holdings in the Bee Manique Settlement but of these only 48 came into operation. Applicants are not keen to take land in this area; progress is therefore slow. In consequence the Land Settlement Committee has advised that there should be no further extension of this settlement until the holdings which have already been allotted have been planted to banana and sugar cane.

162. Contour planting of grass on the steeper slopes has made good progress and by the end of the year some forty acres had been planted altogether. Planting material was furnished to estates and fodder to the cow-owners of the locality.

Plaisance

163. One hundred and thirty holdings were allotted. Of these eight have remained vacant, the selected tenants having failed to occupy their holdings.

Relief Allotments

164. The nine sections of the relief allotments remained in operation during the year. The allocation of the land is summarized below:—

Site	*No. of Allottees*	*No. of Huts*	*Acreage*
Curepipe (Bigara)	32	32	35
Malherbes	18	18	18
Barkly (East)	27	27	27
Barkly (West)	33	13	17½
Richelieu	27	27	27
Bois Marchand (East) ...	20	—	20
Bois Marchand (West) ...	14	—	14
Elysée	38	—	38
Moona	6	6	12
TOTAL	215	123	208½

165. During the year 2 allottees resigned, 5 died and 10 new families were allocated plots. Timber poles were issued for repair work to huts. Rent collected from allottees during the year amounted to Rs 218. Many of the huts were severely damaged by the cyclones.

XVI. Extension Services

VISITS TO PLANTATIONS

166. Improvement of the methods of crop husbandry of small growers remained the prime objective of the Extension Service. 8,862 visits were paid to growers and advice in respect of a great variety of crops centered mainly on the more rational use of fetilizers, the control of pests and diseases and soil conservation measures.

DEMONSTRATION WORKS

167. Demonstrations conducted on farmers' lands on the correct use of fertilizers—type, time and mode of application—totalled 91. Six of these were on sugarcane; the remainder on various other crops. Marked differences in favour of the use of complete fertilizers were observed, as compared to the incorrect method still adopted by certain growers. The yields at harvest showed increases of up to six tons/arpent in the case of sugarcane, 1½ tons/arpent with potatoes and tomatoes, 800 kgs/arpent with French beans and up to five tons/arpent with cabbages.

168. The yield at harvest of many demonstration plots on sugarcane on the upper plateau could not be recorded as they had been too severely damaged by the cyclones.

169. Two hundred and fifty-six demonstrations were carried out on the control of various pests and diseases.

170. Evening meetings, when planters meet purposely to hear talks on specific crops and discuss their problems with the Extension Staff, are an essential and regular feature of the work. These meetings, which are generally held during the intercrop season, were started late in June, planters being little

inclined or unable to attend meetings in the months immediately following the cyclones. 75 meetings were held and the main topics discussed were the control of pests and diseases, the merits of the newly released cane varieties M 202/46 and M 93/48, and the availability of good cane planting material from the district demonstration plots and the Sugar Planters' Rehabilitation Fund Cane Nurseries at Pointe aux Sables.

Propagation and Distribution of Sugarcane Varieties

171. Some 12,600 canes of the newly released varieties were distributed as planting material for further propagation from the district demonstration plots. 40 cane propagation plots were planted in various localities with the new varieties M 202/46, M 253/48 and M 93/48. These plots will serve the dual purpose of showing varietal suitability to different soil and climatic conditions and of providing planting material.

172. Small cane growers expressed concern on the brittleness shown by the variety Ebene 1/37 during the cyclones, and showed interest in the performance of the newly released varieties M 202/46 and M 93/48.

173. In many localities, cane growers who were not able to secure the new varieties, made their new plantations with M 147/44 and B 3337 which are good yielders and show excellent resistance to cyclones.

Cane Nurseries for Small Planters

174. Some 66 arpents of cane were reaped producing 1,237 tons of canes, i.e. 18.7 tons/arpent. 385,380 canes were sold for planting and 592 tons were sent for crushing.

Occurrence of Pests and Diseases

175. Bacterial wilt and late blight remained the major diseases on tomatoes and potatoes. The incidence of late blight was high owing to the rainy and humid conditions that prevailed during the prolonged winter season. Another disease, observed for some years past on tomatoes and which causes yellowing and shrivelling of the leaves, was found to be caused by the fungus *Stemphylium solani*.

176. The insect pests commonly found on farmers' plantations proved very troublesome. The colonies of fruit flies, aphids, caterpillars left after the cyclones renewed their attacks with unusual vigour. Fortunately, they were effectively kept under control by spraying with the more recent and effective insecticides.

177. The control of the bean fly has now become routine practice by almost all bean growers.

178. Fruit flies again prove a major pest on a wide range of fruits and cucurbitaceous crops. Satisfactory results were obtained by the use of Dipterex. The tomato fruit fly, *Pardalaspis cyanescens*, was also troublesome. Extension Officers helped in the release of parasites obtained from abroad for the biological control of these pests.

179. Caterpillars and aphids proved very troublesome but were successfully controlled with Dimecron. In a few cases of severe incidence of caterpillars on cabbage and cauliflower, the use of Phosdrin as an extreme measure had to be resorted to. The spraying of these dangerous substances was done under control of the staff.

Weed Control in Sugarcane Fields

180. Weeds proved particularly troublesome in the cyclone damaged fields where the interlines were left unprotected owing to lack of a good cover. Many growers had to resort to the use of herbicides so as to save on the high cost of hand weeding. They were given the necessary advice and help.

Permanent District Demonstration Plots

181. The district demonstration plots suffered heavy losses. Existing plantations were swept away and buildings suffered considerable damage. Replanting proceeded soon after the cyclones; the buildings however have not yet been repaired and temporary arrangements were made to house the resident personnel. The poor return of crops generally observed and the low cash return obtained are attributed mainly to the cyclones.

Arsenal Demonstration Plot

182. This plot produced 10,514 kgs of foodstuffs and 6,250 canes of the M 202/46 variety which were distributed for propagation purposes. The total revenue collected, amounted to Rs 4,945.20. Quarters for the resident staff have been constructed.

Mapou Demonstration Plot

183. This plot produced 7,954 kgs of foodstuffs and 3,080 canes of the new varieties which were sold as planting material. The revenue collected amounted to Rs 2,634.26.

184. For demonstration purposes a cheap type of cowshed, a pigsty and a goat pen which can meet the modest requirements of the local farmer have been built. An experimental silage pit filled with cane tops has also been constructed.

Vacoas Demonstration Plot

185. This plot situated in a high rainfall area, produced 23,030 kgs of foodstuffs. The revenue amounted to Rs 4,660.62.

Rivière des Anguilles Demonstration Plot

186. The produce of this plot amounted to 13,001 kgs of foodstuffs and 8,450 kgs of canes which were sent for crushing. The revenue amounted to Rs. 4,082.43.

187. As at Arsenal, a cheap type of cowshed, a pigsty, a goat pen and a demonstration silage pit have been constructed.

Central Flacq Demonstration Plot

188. This plot produced 10,202 kgs of foodstuffs and 6,413 kgs of canes which brought in a revenue of Rs 2,669.77. The canes were sold as planting material.

Plaisance Demonstration Plot

189. This plot produced 5,523 kgs of foodstuffs and the revenue collected amounted to Rs 1,823.37. Dry conditions lasting for many months resulted in the poor return.

190. Numerous planters visited the Demonstration Plots, either to obtain advice on specific problems or for information on the methods in use by the Department of Agriculture.

Cyclone Relief Assistance to Small Growers

191. One decision to help foodcrop and vegetable growers to bridge over the difficult period following the two cyclones was the free issue of seeds made to those growers who owned one arpent of land or less and who could not afford the means of buying seeds to start their plantations anew.

192. Five thousand grs tomato seeds, 2,500 grs chilly seeds, 2,000 grs brinjal seeds, 1,500 grs *brède malabar* seeds, 2,375 grs *brède martin* seeds and 350 lbs maize seeds were distributed to 200 growers. Other growers were allowed to take loans through the Credit Co-operative Societies at the rate of Rs 100 per arpent refundable in four years. Some Rs 83,000 were paid out on loans in this way to 830 planters.

Agricultural Teaching in Primary Schools

193. Practically all the school gardens were left unattended after the cyclones even after most of the schools had resumed work after closing down for several months. A certain number of schools were able to carry on with their gardening classes and these were regularly visited. Some 150 visits were made to these schools. A list of garden requirements for all the schools was prepared and approved for next year.

Control of Soil Erosion

194. Soil erosion having taken place during the high rainfall season, the attention of planters was drawn to the necessity of adopting preventive measures. Some 25 arpents intended for cane cultivation of steep land belonging to small growers were staked and furrowed on the contour.

Broadcast Talks

195. Broadcast talks, now made by a wider range of Officers of the Department, were continued on the basis of one per month.

Foliar Diagnosis

196. Leaf sampling of small planters' cane fields for foliar diagnosis could not be made owing to the battered condition in which the canes were left after the cyclones.

Local Production of Storable Foodcrops

Bée Manique

197. Bée Manique went through spells of unfavourable climatic conditions which proved adverse to the raising of food crops and the bringing in of a fair cash return.

198. As a result of the cyclones all the plantations of beans, maize and creepers were swept away and irremediably lost. The first crop raised after the cyclones however proved fairly successful and brought in a good return. Later the humid conditions prevailing proved detrimental to the potato plantations. Late blight set in at a very early stage and it is only through continuous effort that the plantation could be saved. Waterlogged condition of the soil in certain parts caused the loss of about $\frac{1}{2}$ arpent of the potato plantation. A garlic plantation was not successful. A glut on the market did not permit the sale of about 4,000 petsai heads and 1,000 cabbages.

199. The potato plantation gave a yield of about five tons/arpent; unfortunately 25 per cent of the tubers were found damaged by the ' Agrotis ' cutworn. About two tons were sent to Richelieu Experiment Station for storage as seed material for next year.

200. Some five arpents were grown to banana; the balance of 15 arpents produced 102,161 kgs of various foodstuffs. The revenue amounted to Rs 25,873.72.

Plaisance

201. Development work started at the beginning of the year; some fifteen arpents of land were cleared. A plantation of maize on an area of ten arpents was completely lost during the cyclones. Subsequent plantations suffered from drought. Frequent attacks of mites occurred on potato plantations and aphids and mildew on creepers.

202. The potato plantation of 3.20 arpents gave a poor yield owing to the extremely dry condition which obtained towards the end of the year. The creepers did not give a profitable return for the same reason. Some $4\frac{1}{2}$ tons of the potato crop were sent to Richelieu Experiment Station to be stored as seed material. Total production amounted to 8,834 kgs of foodstuffs. The revenue collected came to Rs 3,495.42.

Miscellaneous Activities

203. Various surveys were conducted including:

The assessment of damage done to plantations in the wake of cyclones *' Alix '* and *' Carol '* at the request of the Ministry of Agriculture.

The assessment of rental value and suitability for agricultural purposes of Crown Lands and Pas Géométriques.

The assessment of damage done to plantations by herbicides used on neighbouring plantations.

The compilation of a list of all foodcrop and vegetable growers in the island.

The compilation of returns of the total acreage of the more important foodstuffs harvested each month over the whole island.

The compilation of weekly returns of the market prices of all foodstuffs and fruits on sale in the rural and urban markets.

XVII. Experiment Stations

Curepipe Experiment Station

Development

204. Owing to the very wet conditions obtaining during the early part of the year, only four acres of land were cleared. Access roads were constructed on the area. Further improvements were made to the water distribution system to the various fish ponds on the station mainly by way of underground piping in place of open drains. The continued removal of rocks from the existing fields has provided additional land suitable for arable cultivation. This will enable more extensive investigation of potato and other food crops. In order partly to increase the reserve of cattle fodder, and partly for experiment, four new silos were constructed at the Livestock Breeding Station, Curepipe. The filling, recording and emptying of these silos remain the responsibility of the officer in charge of the Experiment Station. Of the four silos constructed, one was a trench silo of the bunker type with a capacity of approximately 50 tons. The remaining three were pit silos of respectively, 5, 10 and 15 tons capacity. Three methods of lining were tested on the silos. A stone libage wall was used on the 15 ton silo, cement rendering with wire netting reinforcement on the 10 ton unit, 4" concrete blocks on the small 5 ton pit, and cement rendering with reinforcement was used on the trench silo. The cost of these various linings was recorded, and a first indication of their relative effectiveness will be obtained when the first filling of cane tops is fed early in the coming year. It is essential that underground silos be lined in this superhumid zone where the water table is usually high. The use of the two large tower silos at Curepipe has now become routine and forms part of the normal feeding programme at the dairy.

Fodder

205. Investigations into the fertilizer requirements of newly-planted, and of established *Setaria sphacelata* were continued. On established grass, the application of 150 lbs of sulphate of ammonia after each cut gave a significant increase in yield compared with 50 lbs per acre, 200 lbs per acre after each cut gave a significantly better yield than 100 lbs per acre. On newly established setaria, different levels of nitrogen produced no significant increase in yields on the first two harvests. On established setaria, the effects of three levels each of phosphate in the form of single superphosphate, potash in the form of sulphate of potash and lime in the form of slaked lime were tested. The results were not significant either on direct or interaction calculation. On the newly planted setaria 220 lbs of single superphosphate gave significantly better yields than no phosphate, but a higher dressing did not produce a significant increase in production. Lime and potash both showed no significant difference at the various levels, or by interaction.

206. The method of planting setaria was revised during the year. In earlier plantings, the grass was grown in lines three feet apart to facilitate inter-row weeding. The method now being tried is to plant at a spacing of $1' \times 1\frac{1}{2}'$ overall, thus giving a complete mat of grass where weeds are less likely to obtain a hold on the field. So far this method appears to be giving better results than the one previously used.

207. A wide range of the grasses introduced in 1959 and 1960 were tested in observation plots at Curepipe. Various strains of European grasses were introduced from East Africa including rye-grass, cocksfoot and timothy, but production of these species was not promising. One of the main difficulties which have been experienced in producing fodder in the super-humid areas has been the poor production of setaria in the colder winter months. Two introduced grasses appear very promising in providing fresh fodder during these months. These are Kikuyu grass—*Pennisetum clandestinum*, and Rhodes grass—*Chloris gayana*. Of the latter grass, two strains have been imported, ' Mbarara ' and ' Endebess '. Both these are good producers, with possibly Endebess showing higher productivity. Other grasses doing well at Curepipe are the strain ' Sigor ' of Guinea grass—*Panicum maximum*, and the two species of Pangola grass—*Digitaria pentzii*—from South Africa, and *Digitaria decumbens* from the West Indies. These latter species are likely to be more useful in the drier coastal areas, as both are drought resistant types. The utilization of the essentially grazing grasses such as Pangola was tested by grazing trials. The results of these trials are not yet complete.

Preliminary records show that animals grazed at night, and fed only with concentrates in the daytime show a liveweight increase which compares favourably with that of animals which are stall-fed with cut fodder, and the same amount of concentrates.

208. Fodder supplies to the Livestock Breeding Station at Curepipe were maintained throughout the year either with grass from Curepipe Station, acacia from Plaisance, or cane tops during the sugarcane crop season. In addition, some 200 tons of cane top silage was produced for feeding in periods of fresh-fodder shortage.

209. A variety of species of legume grazing crops were imported and tested during the year. The object of these introductions was to find suitable legumes for growing in conjunction with grazing grasses to give a more nutritious pasture. None of the species tried showed much promise in the first year. One item of interest in this work was the sudden appearance on the station of self-sown plants of *Trifolium Ruepellianum*, a red clover introduced some years ago and abandoned as being unsuitable. The seeds from this original introduction plot have lain dormant in the ground for three years, and germinated only in June 1960. In view of it having grown spontaneously through a stand of Rhodes grass, this species would appear to be one which should be given further consideration. With this in mind fresh introductions are being made from East Africa for further investigations. The Russian Comfrey—*Symphitum peregrinum*, which has been under observation for some years has again failed to give satisfactory yields mainly owing to the occurrence of a bacterial rot of the lower leaves. Acacia, *Leucaena glauca*, continues to progress well although the rate of establishment is very slow in the colder and wetter uplands as compared to the more natural habitat of the coastal areas.

Orchard Crops

210. The citrus orchards established in 1957 and 1958 were severely damaged by the two cyclones. Replanting of these orchards will be necessary as soon as suitable improved budded plants become available from the citrus

nurseries at Barkly Experiment Station. Small plots of guava, kaki, and apples which were established in 1959 have progressed as well as can be expected following cyclone damage. The object of these plantings is to give greater economic use of the numerous stream and river reserves in the upland areas. It is intended to try various tree fodders on these areas at a future date when planting material becomes available.

Food Crops

211. Investigations into potato production in the super-humid zone were continued. In a variety trial including the varieties King George, B.PI and Pimpernel, the latter variety showed good yielding capacity and, perhaps more important, was highly resistant to blight. Potato storage trials were severely affected by the cyclones and further work is in progress. A ' time of planting ' trial on maize showed conclusively that maize in this area should be planted in the period June to September for maximum production. As had been found in previous years, certain of the temperate vegetable crops can be grown in the uplands outside of normal months resulting in vegetable supplies being extended later in the season. This has been found to be especially so in the case of cauliflower where good marketable curds were produced as late as February when normal supplies to the markets from the lower areas cease in November. A factorial trial on ginger—*Zingiber officinale*—was laid down to assess the fertilizer requirements of this crop. Results showed that 48 kilos of potash as sulphate of potash gave significant increases in yield, as did the application of 10 tons of farmyard manure. A positive reaction between potash and phosphate was shown which would indicate that phosphatic fertilizers were necessary for full response to potash fertilizers. Lime gave indications of having depressed yields of ginger.

Livestock

212. The duck flock remained healthy during the year, the flock of geese was increased by purchase and breeding. The use of geese to assist in the maintenance of the fish pond banks has proved successful, and only small quantities of concentrates were fed, the geese obtaining most of their food by grazing round the ponds.

213. There are now three small demonstration cowsheds at Curepipe. Two are situated on the banks of fishponds on the station for the investigation of the interrelation of the two aspects of production, and one at the Livestock Breeding Station for demonstration only. These cowsheds were constructed of cheap local materials at a minimum of cost, and all three withstood the effects of the cyclones with little or no damage.

RÉDUIT EXPERIMENT STATION

Development

214. The installation of the overhead irrigation pump and water mains was completed during the year, and test runs were made. This pump is powered by an electric motor, and it is intended to use this installation for comparison with the diesel engine powered pumping sets installed at other experiment stations.

Orchard Crops

215. The citrus orchard was severely damaged by the two cyclones as were all orchard crops. Investigations into the cause of chlorotic leaf symptoms were continued by again trying leaf sprays of zinc and manganese, but no assessment of results was possible owing to the damage incurred by the cyclones. It would appear in general that the problem is very complex, and further investigations into all aspects of citrus production are in progress.

216. The banana plantation was severely damaged, and is to be replanted during 1961. *Cercospora* leaf spot remained in the plantation, and no planting material was allowed off the station to prevent the spread of this disease.

Grass and Fodder

217. The introduction area continued to be fully utilised. All new introductions are being planted in this area partly for observations, partly for bulking up of planting material and partly to enable the Plant Pathologist and Entomologist to keep a constant watch for any possible introduction of pests or diseases. The large number of grasses introduced in 1959 were supplemented by further species during 1960. Many of the better grasses and legumes were transferred to other stations for assessment under various climatic conditions. The grass species showing most promise under conditions prevailing at Réduit are Guinea Grass, strain ' Sigor ' *(Panicum maximum)*, the ' Mbarara ' and ' Endebess ' strains of Rhodes Grass *(Chloris gayana)*, and the two species of Pangola Grass *(Digitaria pentzii* and *D.decumbens)*. Two strains of Elephant Grass *(Pennisetum purpureum)* which were selected from self-sown seedlings in 1957 have shown considerably better growth than the normal local type of this grass. The leafiness of these strains is much better than the local, and every effort is being made to propagate them for growing on other stations.

218. Numerous clovers and leguminous forage crops were introduced during the year. Assessment is continuing, but cannot be finally reported until later on. One item of interest has been the appearance of a strain of White Clover, possibly *Trifolium Ruepellianum* which was introduced in 1956 and abandoned. This would appear to be of similar occurrence to that reported of *T.Ruepellianum* at Curepipe. Observations of this variety continue. Lucerne —*Medicago Sativa* continues to grow well, but is still a shy seeder at Reduit. The Russian Comfrey—*Symphitum peregrinum*—again suffered heavily from leaf rot, and does not appear to be suited to the climate.

Food Crops

219. A randomized block experiment was laid down to assess the comparative value of the large number of yam varieties held on the station. Results showed that only four varieties were worth retaining for future work. These were ' Light Red ' and ' Angiliata ' which were both heavy yielders, and ' Danish ' and ' Fugue ' which showed very high quality. A similar trial was carried out on the varieties of sweet potatoes which had been retained on the station for some years. The results of this trial showed that of the early varieties only ' Violet ', ' Patate Rouge ', ' Joes ', and ' Pelican Processor ' were worth further work, and of the late varieties only ' Mirebelle ' was worth

retaining. The collection of Manioc (cassava) varieties sustained severe damage from the cyclones, and no trial assessment was possible. Planting material is being accumulated for work in 1961. Some eight acres of vegetable seed crops were grown during the year as part of the normal seed production scheme. All seeds produced were transferred to Barkly Experiment Station for processing and sale.

220. A large number of groundnut varieties were imported from East Africa during the year. These were tested in a variety trial. Preliminary results have shown that the following varieties were worth further trial—AR 48/38, AR 28/206, AR 24/11, Gudiyathan, Mgongo. Differences in resistance to bacterial wilt and to Cercospora leaf spot were noted, as were variations in time of maturity.

221. A randomised block potato variety trial was carried out, and results show that the varieties ' Patroness ', ' Kerr's Pink ', ' Delaware ', ' Oosternbrink ' and ' Pimpernel ' all yielded well. Some effects of disease resistance were noted. A further trial to assess the relative value of once grown seed potatoes was carried out. The general effect of once grown seed appeared to be a much more uniform germination, and higher yields as compared to seed imported directly. The main high yielding varieties in this trial were Saranac, 'King George', 'Abyssinie', 'Majestic', 'Factor' and 'Sebago'. Further work on this important aspect of potato production is planned.

Barkly Gardens and Experiment Station

Seed Production

222. The demand for vegetable seeds was greatly increased owing to the losses sustained by planters from the cyclones. Sales of seeds again rose in quantity and value, although there was a considerable reduction in revenue from the sale of plants. This was mainly occasioned by the loss of some 50 per cent of all plant stocks during the cyclones. 5,164 kilos of vegetable seeds were produced during the year including 4,470 kilos of peas and beans. These seeds were grown on a total acreage of 33 arpents, 20 of which were at Barkly, and the remainder at various other experiment stations.

223. The value of sales of seeds and plants over the last three years are tabulated below:—

	1958	*1959*	*1960*
	Rs	*Rs*	*Rs*
Sale of seeds	16,069	26,727	28,136
Sale of plants	86,244	13,759	9,273
Total	42,313	40,486	37,409

Development

224. The ten arpents of land taken over from the Relief Allotments at Barkly were cleared during the year. Of this area, five arpents were completed in time for cropping during the year. The remaining area will be completed for use in 1961. A new irrigation pump and diesel engine were installed on

the cropping area to provide additional pumping capacity for the extended area under cultivation. This, with the new main pipes, will provide adequate overhead irrigation for the increased area now available for vegetable production.

The new Burgess Mist Propagator and greenhouse were damaged during the cyclones. Repairs were carried out. Considerable experience has been gained on this method of propagation during the year.

Citrus

225. Barkly is now established as the main citrus propagation nursery. The trial budding of stocks at monthly intervals has shown that the best month for such work is April, although fairly good results were also obtained in May and June. The stocks used for this trial were Rough Lemon. Further supplies of Florida Rough Lemon and Waterkloof Sweet Orange seeds were received from South Africa, and will serve as the supply of stocks for the 1961 budding. A local variety of Rough Lemon was found in the district of Savanne and seeds were obtained for trial. The provision of these various types of rootstocks will enable a quantity of good quality budded plants to be produced for new field trials of the stock/scion relations, and for general husbandry investigations.

Orchard Crop

226. The mango orchard planted in 1927 was damaged by the cyclones, but has shown considerable recovery during the year. The letchi orchard was very severely damaged, and many of the trees are dead. The orchard of avocado pear, peach and letchi planted since 1947 were virtually destroyed and will require replanting. Much of this work is being transferred to other stations where the climate is more suited to the tree crops concerned.

Vegetables and Food Crops

227. Vegetable seeds imported from Australia showed little improvement over the established acclimatized strains, and as usual, the imported cauliflower varieties failed to produce good curds under Mauritius conditions. The increase in experimental work on vegetables was the main feature of the year's work. A spacing trial on dwarf beans using variety Victory showed that a spacing of 3″ in the rows using two rows 6″ apart at three feet centres gave significantly higher yields than 6″, 9″, or 12″ in the row. This result was apparent both in green bean and in dry pulse yields.

Fertilizer trials were carried out on carrots, beans, and *brède Martin*. No significant response to fertilizers at the trial dosage was found in the trial on carrot.

228. The trial on Victory beans, harvested as green beans showed no response to potash but 20 kgs of phosphate as superphosphate, and 10 kgs nitrogen as Sulphate of Ammonia gave significant increase in yields. The application of double these amounts gave no significant increase in yields over the lower quantity. Yields of *brède Martin* were significantly increased by the application of 10 kgs of nitrogen, but not significantly further raised by 20 kilos. Potash gave no significant response. The use of 20 kgs per acre of

phosphate as superphosphate gave no significant increase, but 40 kgs of P_2O_5 significantly increased yields. A variety trial to test various local and imported varieties of tomato for disease resistance and suitability to local conditions was carried out. All the varieties were found susceptible to blight, and routine spraying with Maneb fungicide significantly increased yields. The highest yielding varieties were X23A, Oxheart and Western Red, all of which showed significantly better yields than the local *pomme d'amour* and the locally popular Marglobe variety. A trial to test Botrilex as a means of controlling leaf rot in lettuce was carried out, but under local conditions, no control was found even at the highest rates of application of the chemical. A trial to assess the value of various fungicides used on potatoes was carried out. The results of this showed that all the sprays used gave significantly greater yields than the plots which were not sprayed. Of the various fungicides used, Zineb was more effective than Soltosan or Captan. The spray chemicals in order of effectiveness as shown by increased yields were: Zineb, Cuprokylt, Soltosan and finally Captan.

Hydroponics

229. Work on this aspect of production was reduced during the year mainly owing to the preoccupation of staff in rehabilitation of the Station after the cyclones. Cropping of some of the beds with potatoes was carried out. The value of this system of growing crops is to be further investigated.

Abercrombie Nursery

230. The importance of this station was increased during the year by the transfer of 4 arpents of land from the Forest Department. This land was cleared of trees, and has been partly planted with mango varieties to which the area is admirably suited. The response of mangoes to various manurial treatments will be investigated. Planting material will also become available in increased quantities for sale to the public. At the same time, work is proceeding on the establishment of a wide variety of ornamental shrubs for propagation purposes, for ultimate sale to the public.

RICHELIEU EXPERIMENT STATION

Development

231. Four new barns were completed three of which were in service during the year. Two are fitted with flues, and one with a stream-curing unit. A steam-curing unit for the fourth barn arrived at the end of the year. The barns are each 16′ × 16′ by 9 tiers high, giving a capacity of 2½ tons of green leaf each. The walls have been built of concrete blocks and coated inside with aluminium bituminous paint to make them waterproof.

232. The installation of new pumps for the overhead irrigation system was completed. The two pumps can deliver over 600 gallons of water per minute at a pressure of 80 lbs p.s.i. This should greatly facilitate trial work on the Station.

233. Two small fish ponds, each of 1/10th acre, were constructed. One is being run in conjunction with a small piggery. The construction of a cowshed near the other pond is being completed.

234. The construction of pit silos at Richelieu was completed. There are now three pit silos of capacity 4, 9 and 18 tons, a trench silo of 18 tons and a tower silo of 22 tons.

Tobacco

235. *Seed-beds.* The cyclones *'Alix'* of 19th and 20th January and *'Carol'* of 27th and 28th February caused so much damage to seed-beds that seed-bed experiments were ruined. Enough planting material was saved for planting the seed-production fields and the plots of 'Blank Shank' resistant varieties. New sowings were made to complete the planting of the experimental fields and to supply a fair amount of planting material to tobacco growers.

236. Most of the chemicals which have been experimented with at the station for the control of pests and diseases in seed-beds are now in common use by tobacco growers. Ethylene dibromide (E.D.B. Nematox) and sodium methyl dithiocarbamate (Vapam, Unifume) for the control of eelworms, zinc ethylene bis-dithiocarbamate (Zineb, Murphane), for the control of both soil borne and spot diseases, Aldrin for the control of insect pests are all being used with good results.

237. More chemicals will be tested in seed-bed experiments in 1961 for the control of pests and diseases. There are signs that some insects, e.g. cutworms and leaf eating caterpillars, are becoming resistant to insecticides which have been in continuous use for three or more years in seed-beds.

238. Methyl bromide is still being used at the experiment stations as the most efficient chemical for soil sterilisation.

239. *Fields.* The 'Black Shank' resistance trials at Richelieu and Pamplemousses, which had been planted with five recent introductions from the U.S.A. and with three already established Virginian varieties in October—November 1959 were destroyed by the cyclones. Seed-beds were destroyed or severely affected, with the result that planting of fields was delayed. The late plantings, starting in April, gave very good results as regards both yield and quality of leaf. Incidence of frog eye was low. Insect pests, particularly leaf eating caterpillars caused considerable trouble during the months March to June, probably as a result of the cyclones.

240. At Pamplemousses, various systemic insecticides were tried for the control of insect pests. The leaf from the various treatments has been kept for tests, and will not be sold to the Tobacco Warehouse until the residual effects have been determined.

241. The insecticidal treatments have had no detrimental effect on the grade of tobacco produced as is apparent from the following table:—

	Yields	*Value of leaf*	
	Kg./acre	*Rs./kg*	*Rs./acre*
Rogor 40 at 5 cc. per litre	423	7.40	3,133
Metasystox at 5 cc. per litre	335	8.60	2,879
Phosdrin at 5 cc. per litre	411	7.90	3,247
Dimecron at 5 cc. per litre	432	7.41	3,201
Control (DDT) at 5 gm. per litre ...	428	7.70	3,294

242. At Richelieu, investigations on the control of eelworms in the field were continued. An experiment was made to study the effect of two E.D.B. treatments in conjunction with three types of planting material, on the yield and quality of the leaf. The E.D.B. treatment did not produce significantly better results than the control. It was found that the root infection of the plants in the whole experiment was low. This suggests that E.D.B. application is not warranted unless the initial infection with eelworms is high—such as occurs when tobacco is planted for two or three consecutive years in the same field.

	Yields Kg./acre	*Value of leaf Rs./kio*	*% root infection*
E.D.B. treated			
Earth balls	432	6.25	0.54
Soil blocks 2 cu. ins	470	5.33	0 65
Soil blocks 8 cu. ins	492	5.60	0.14
Mean	465	5.73	0.45
Control—No. E.D.B.			
Earth balls	389	6.36	2.66
Soil blocks 2 cu ins	487	5.50	3.20
Soil blocks 8 cu ins	519	5.36	4.30
Mean	465	5.74	3.39
L.S.D. 5% P	80.2	0.52	Not sig.

243. A small trial was carried out at Pamplemousses, in which the effect of three fungicides namely Captan, Soltosan and Zineb in the control of spot diseases, were tried. The plants for the experiment had been raised in beds treated with methyl bromide and were free from spots when pricked in earth balls. At the time of planting, all plants were severely infected with frog-eye. The incidence of frog-eye in the field decreased gradually with the onset of the cool season, although some barn spot occurred up to the end of harvest. The results are shown in the following table:—

	Yield Kg./Acre	*Value of Leaf*	
		Rs./Kg	*Rs./acre*
Captan (Orthocide) 1½ lbs/acre ...	392	8.55	3,351
Soltosan 2 lbs/acre	508	7.41	3,765
Zineb 1 lh/acre	436	9.28	4,042
Control (No fungicidal treatment	363	8.86	3,218

244. Investigations on the manurial and fertilizer requirements of tobacco were continued at Richelieu. The crops are grown under overhead irrigation. In a fertilizer experiment, which comprised combinations of three levels each of nitrogen, phosphate and potash, differences in yields and value of leaf per acre were not significant.

245. In another experiment the effect of three sources of phosphate was compared—equally good results were obtained by the use of superphosphate, phospal or tobacco mixture 10:28:14. The fertilizers were applied at the rate of 10 kg N., 46 kg P_2O_5, and 14 kg K_2O per acre.

246. The ' Black Shank ' resistant varieties were planted again in mid March for further tests of resistance, yield and quality of leaf. The results are shown in the following table:—

	% diseased	Yields Kg./acre	Value of Leaf Rs./acre
Vesta 30	1.4	483	3,046
Dixie Bright 101	7.2	492	3,269
Oxford 1/181	18.1	464	3,174
Dixie Bright 28	10.8	512	3,367
Hicks Broadleaf	39.1	186	1,143

Vesta and Dixie Bright 101 are the most promising varieties. All the varieties were included in a new trial planted at the end of the year together with more recent introductions. Two varieties of Burley, resistant to ' Black Shank' disease were planted for the first time at Richelieu in mid-June. The plants flowered early, probably owing to short day conditions. Seed has been saved from both varieties for further work.

The root examination of the plants gave the following results:—

	% Root Infection	
	Black Shank	Eelworms
Burley II A	52%	69%
Burley II B	6%	25%

247. *Seed Production.* At Richelieu station, 44 kg of seed of 4 commercial varieties were produced. As a result of the cyclones, the previous stock of seed for supply to tobacco growers had been almost completely used up. Sufficient seed was produced during the year to provide for two years' supply at the present rate of issue.

248. All tobacco seed was cleaned through a seed separator and dried for storage. The usual germination and moisture tests were carried out during storage; the seed, after treatment with 1/1000 solution of silver nitrate, was issued to growers.

249. *Curing.* At Pamplemousses, the re-circulating air system was increased by 1/3 in one barn and decreased by the same amount in the other. The quality of the cure in the first barn was better than in the second barn throughout the season. The first barn was also more economical in fuel consumption.

250. At Richelieu, a 16′ × 16′ barn fitted with a steam-curing unit was much more economical in fuel than another barn of the same size fitted with flues. The fuel consumption of the first barn averaged 2¼ cords (4½m³) of fire wood as compared to 4 cords (8m³) in the other per cure of 2½ tons of green tobacco leaf.

251. In one of the older 12′ × 12′ barns, the walls were rendered inside with cement and the Gundry type furnace was reduced in size. The fuel consumption averaged 1 cord (2m³) of firewood per cure of 1 ton of green leaf. Two cords of firewood were required per cure in the three other barns of the same capacity.

252. A small feed pump was added to the boiler used for the steam-curing unit. This has enabled all condensate water to be used for feeding the boiler and has resulted in a considerable saving of firewood. A second steam-curing unit is being installed in an adjoining barn and will be fed from the same boiler. It is hoped that the efficiency of the whole system will be increased thereby.

253. *Leaf Production.* At Pamplemousses, a 2.8 acre plot was planted with the variety Yellow Mammoth at the end of April. The area was treated with ethylene dibromide at the rate of 30 kg E.D.B. (20 per cent ethylene dibromide) per acre by means of a two row applicator mounted on a Bentall disc ridger in mid-April. This plot produced 1,198 kg of leaf tobacco which was sold to the Warehouse for a value of Rs 9,221.89 cs.

254. At Richelieu, 2,112 kg of Amarello leaf of a value of Rs 11,170.23 cs was produced from a 2-acre field. The experimental plots of Virginian varieties produced 3,199.5 kg of leaf of a value of Rs 19,819.60 cs.

255. Three hundred and twelve and a half kg of leaf from the experiment with systematic insecticides at Pamplemousses have been baled and kept for further tests.

256. Two hundred and thirty kg of leaf of MF grade from Richelieu was baled and stored at the Warehouse for an experiment in which a Swing Fog sprayer is being used to apply insecticides for the control of the tobacco beetle.

257. *Potatoes.* Seed of various varieties were received from Kenya and were planted at the end of April in a variety trial. The varieties were compared with the Australian variety Delaware—a very popular variety in Mauritius. Sprouting of one of the Kenya varieties, Profit, was very poor and the incidence of virus diseases in another variety was high.

The stand of all varieties was low and the yields were reduced accordingly. Delaware, which gave the higher average yield was not significantly better than Oosterbrink, Pimpernel, Patroness and Maritta.

Seed of other varieties from New Zealand and Australia were planted in a second trial in September. There was a very severe attack of the tubers by various borers which reduced the yields considerably. However, the varieties Arran Banner, Sebago and Arran Chief performed almost as well as the variety Delaware.

A third trial, starting at the end of April, was planted with seed saved from the trials of the preceding year. The stand of most varieties was good; incidence of virus diseases was low on the average. The varieties Sebago, Ulster Supreme, Saranac, Majestic and Factor were as good yielders as King George, another popular variety in Mauritius.

258. Routine sprayings with systematic insecticides and DDT to control aphid vectors of virus diseases were carried out in all trials. Control of aphids was very good.

259. Investigations on fertilizer requirements, spacing, induced sprouting with thiocyanates, seed production and seed potato storage were continued during the year.

260. *Other Crops.* Three varieties of the dwarf bean were grown in considerable quantities, both at Richelieu and at Pamplemousses Stations. At Richelieu the crops were raised mainly in plant cane interrows in September. The beans and canes followed the tobacco crop and no fertilizer was applied to the beans. The crop was remarkably free from pests and diseases. Yields of seed were fair. At Pamplemousses a 3-acre plot was planted in May with ' Victory ', a dwarf variety popular in Mauritius. Incidence of the insect pest, *Nacoleia,* was very high. Repeated applications of Dimecron did not give satisfactory control but two consecutive sprayings of Phosdrin cleared the pest along with various pod borers. The yield of seed from the plot averaged 500 kg per acre.

261. Maize was grown both for seed and silage.

262. Following the cyclones, the crop of sugar cane was only 390 metric tons at Richelieu. In 1959, the crop on about the same area was 628 tons. At Pamplemousses, the crop averaged 20 tons per acre.

263. New introductions of grasses, both fodder and pasture, were under observation at Richelieu. *Digitaria pentzii* and *D. decumbens* are amongst the most promising and have both been established on a field scale at Richelieu.

264. *Mechanization.* There was little addition to the range of mechanical equipment in use at Richelieu. The reversible moulboard plough proved a very reliable instrument for working under all conditions of soil, including old cane fields, and gives very uniform cultivation. Rotavators were superior to cultivator tines in interrow cultivation work. The latter do not deal satisfactorily with deep rooted weeds.

265. *Dairy.* The roof of the cowshed suffered severe damage from cyclone ' Alix ' and was completely destroyed by cyclone ' Carol '.

266. The total milk production amounted to 16,565 litres giving an average daily production of 6.2 litres per cow kept. There were a few cases of mastitis which quickly responded to treatment. 2 bull calves and 5 heifers were born during the year.

267. The silos were all in use throughout the year. They were filled with maize at the beginning of the year and again with cane tops in the second half of the year. The total capacity of the silos at Richelieu is now about 70 tons. The percentage wastage was reasonably low in all types of silos, including the pits. The pits have been lined with a mixture of lime and red earth with very good results. The least wastage occurred in the smallest pit, capacity 4 tons, and averaged only 5 per cent over two trials. Towards the end of the sugarcane crop, the small silo was filled with cane tops to which 2 per cent of molasses and $\frac{1}{2}$ per cent of urea were added. The silage was of good quality and was readily taken by the cows.

268. *Poultry.* The poultry unit at Richelieu was taken over by the Veterinary Division in June 1960.

269. *The Royal Botanic Gardens of Pamplemousses.* The care and upkeep of these gardens form part of the functions of the Agriculture Division ot the Department, as do the gardens of Government House, Port Louis, Government House, Le Réduit, Headquarters House Vacoas, and Telfair Gardens, Souillac. The Royal Botanic Gardens were severely damaged during the cyclones in 1945, and a long term rehabilitation programme was only completed in 1957. During 1959, a complete revision of the plant lists and the block plans of the gardens were carried out. In November 1959, a severe flooding of part of the gardens occurred, and several trees were damaged. In January and February 1960, the gardens were severely hit by the two cyclones which then struck Mauritius. Over 1,000 trees were destroyed and many which apparently withstood the wind died later. Following the cyclones, the gardens were closed in order to remove all the debris and to cut out dead and dying trees which would be a danger to the visiting public. By the close of the year, the gardens had been put in order as far as was possible in the time, and it was decided to open them again to the public. The work of selective felling, pruning and replanting of species lost in the cyclones will proceed for several years to come.

270. *Livestock Breeding Station, Palmar.* This station of about 575 acres on the East Coast of the island is fairly representative of the soil types and climatic conditions prevailing on the coastal belt. The original cover of the area was mainly an association of *Litsoea glutinosa* and *Leucaena glauca* growing on the rocky brown laterite soil, and *Stenotaphrum dimidiatum* growing on the coral sand soils under the shade of Casuarina trees.

271. The Station was severely damaged by the cyclones. Most of the Casuarina trees were destroyed or had to be felled and the result was that the Stenotaphrum sward dried out during the drought that prevailed during the latter part of the year.

272. During the year about 225 acres of the shrub land were bulldozed and cleared of rocks with a view to establishing improved grasses and other fodder plants suited to the area. A start has been made in fencing the perimeter and dividing a few paddocks for propagating strains of grasses found to be suitable for the coastal belt.

273. Progress on repairs to the damaged stock sheds and fences was rather slow owing to commitments in other sections of the Department.

274. The making of silage from cane top on a practical scale was continued. A 50 ton trench silo and a 25 ton pit silo yielded silage of good quality which proved most useful during the drought period.

275. Planting of elephant grass was started on the buildozed area and about 5 acres had been planted by the end of the year. At the end of the year there were the following numbers of stock on the station:—

Creole Cattle	83 head	
Ongoles	48 ,,	
Borans	26 ,,	(of which five calves born locally)
Anglo-Nubian Goats ...	40 ,,	
	109	

276. *Cattle.* The Borans were a new introduction; five bulls and 16 heifers were imported from Kenya during the year. Their adaptability and growth potential will be assessed under local conditions before breeding animals are made available to the public.

277. It was shown during the year that it was possible, with supplementary feeding, to rear Creole steers on pastures of the coastal belt. The preliminary findings are as follows:—

(a) It is marginally economic to supplement concentrates to Creole steers grazing on Stenotaphrum pastures.

(b) It is uneconomic to supplement ureated molasses only to Creole steers grazing on Stenotaphrum pastures.

278. *Goats.* The pure bred Anglo-Nubians are doing well and milk production has been satisfactory. The milk yield of half-bred Anglo-Nubian and local goats have shown very encouraging results.

279. Four Ongole bulls, four Anglo-Nubian and cross-bred bucks, two Anglo-Nubian and cross-bred does were sold to breeders.

280. Eight Ongole cattle were sent to Diego Garcia and Agalega islands to assess the possibility of rearing beef cattle there.

Two Ongole bulls, 12 Creole bulls, 3 Creole steers were sold for slaughter.

Curepipe Livestock Breeding Station

281. The programme of selective breeding of Creole milch cattle was continued during the year. The production of weaner pigs to encourage pig rearing is now in full swing. The newly imported British Alpine goats were temporarily kept at this station. At the end of the year there was a total of 242 head of stock at the station including 9 bulls, 63 cows, 17 heifers and 28 bull calves of the Creole breed, 46 Large White pigs, 12 British Alpine and 2 Anglo-Nubian goats.

282. Damage caused by the two cyclones was not very severe. The most urgent repairs have been completed. The labourers have been provided with a mess room and the construction of a carpentry shed was started.

283. At Curepipe where twice daily hand milking is practised, the total milk production was 130,858 kgs; the average number of cows in lactation was 51 and the average daily production 6.9 kgs (15.18 lbs). The average calving interval for 49 cows was 408 days, amongst the animals that calved during the year, 19 were first calvers. 70 calves were born during the year (42 males and 28 females). The following number of animals were culled:—

16 cows (owing to poor production or old age);

2 adult bulls (to be replaced by young bulls about which more information was available).

284. As many station-bred heifers were coming into production, the purchase of Creole cattle for the breeding programme was limited to 8 animals.

285. The pig breeding policy is now in full swing and the following data is available on first year of production.

(a) 14 litters were farrowed having an average of 9.3 piglets per litter and an average birth weight of 2,29 lbs per head.

(b) 11 litters were weaned during the year the average being 8 piglets weaned per litter at an average weight of 32.8 lbs per piglet, weaned at 8 weeks old. Of these 88 piglets. 73 were sold for breeding, producing an average price of Rs 129.44 each.

XVIII. Plant Pathology

Tobacco

286. As a result of the cyclones and the protracted first season the tobacco crop was generally healthy and nowhere was there any high incidence of leaf spots. Brown spot *(Alternaria longipes* (Ell. and Ev.) Mason) was present in a few plantations at the end of both seasons but this year again there was no epidemic.

287. Frog eye *(Cercospora nicotianae* Ell and Ev.) was absent from many plantations no doubt as a result of the blowing away and destruction of all spores from grading sheds and barns. Belle Mare which repeatedly suffered considerable losses due to frog eye in recent years was completely free from it this year. Frog eye was seen on trials at Richelieu Experiment Station mostly around recruits. At Pamplemousses a severe outbreak occurred in the seed beds. In the field judicious priming reduced the incidence, until infection was reintroduced with recruiting. The recruits themselves did not make satisfactory growth owing to competition from the surrounding plants. They were not primed separately and thus served as foci of infection. The practice of late recruiting is therefore not recommended. In an observation trial there was no difference in the incidence of spotting, between plots treated with Zineb, Captan, Soltosan and the control plot. Chemical control of the disease in the field is therefore not recommended. A few frog eye spots were seen on an exposure plot planted at Barkly outside the tobacco growing areas: the plot was uprooted immediately. However the absence of frog eye from Etoile and several other localities point to the absence of effective alternate hosts. Control measures, therefore, could be effective and should be concentrated in the seed beds and nursery stage, by avoiding too thick sowing and stacking, and spraying the seedlings with Zineb; early disposal of seedbeds after planting out, avoiding recruiting or having special later sown seedbeds for recruits, and by judicious early pruning in the field. Death of young transplants at Triolet was attributed to black leg caused by a bacterium *(Erwinia aroidea)*. Several plantations at Flacq with cases of Bacterial or Granville wilt *(Pseudomonas solanacearum* (F. Smith), were observed. A Black Shank type of infection was very high in Dixie Bright 28 in a variety trial at Richelieu while the commercial varieties were highly resistant. The identity and status of the disease is under investigation. A *Fusarium* sp. and nematodes were found in association with bacterial wilt disease. Plantations with high root knot infections were observed both in sandy coastal lands and gravelly interior soils at Caroline. Other nematodes may be of importance and symptoms resembling stem break caused by *Ditylenchus dipsaci* were observed on

Jamaica Wrapper at Richelieu. Hole injection of nematocide in the field is being considered. Powdery mildew was widespread, even the winter plantations at Etoile had some infection in mid-November and some was found on Amarello at Richelieu. Seed beds were generally healthy. Virus incidence was rather high; at Richelieu symptoms of a yellow strain of Tobacco mosaic virus were observed. Line necrosis and ring spot patterns were common, although aphids were not very obvious. A few plants affected with leaf curl were reported from Calebasses together with the white fly vector. Burley 11A and 11B seedlings showed symptoms of cold chlorosis, and Dixie Bright 101 those of magnesium deficiency.

Tea

288. A leaf curl and defoliation of tea seedlings in a nursery at Wooton was on investigation found to be due to aphid damage.

Potato

289. Late blight was first noted in late June at Phœnix but two series of variety trials at Reduit and Richelieu practically escaped blight. Two variety trials at Curepipe were affected from an early stage and very good resistance was found in Pimpernel and near immunity in C 53. In a five treatment, 3 replicate, fungicide trial at Barkly, under severe late blight conditions for the variety King George under overhead irrigation, Zineb was clearly superior to Captan, both for foliage protection and yields. It would appear also that Zineb was more effective than Soltosan against early blight which was common especially on Delaware. Bacterial wilt was very severe and typical foliage and tubers symptoms suggestive of ring rot were frequently observed. No *Corynebacterium* however could be found, and all cultures yielded the bacterial wilt organism *Pseudomonas solanacearum*. ' Saranac ' a variety reported resistant to ring rot had 55 per cent of the tubers affected while King George, a variety favoured locally for its resistance to bacterial wilt, had 25 per cent affected in the worst plots, in a variety trial at Reduit. The two forms of bronze leaf wilt formerly suspected to be virus diseases were traced to mite *(Vasates lycopersicae)* and thrips damage respectively. Scoring for virus diseases especially leaf roll was carried out in connection with the production of local seed potatoes.

Maize

290. Maize rusts were practically absent since the harvesting of a small plot which had survived the cyclones, and which had shown 100 per cent infection at harvest at Reduit. Infection was observed to be building up in one plantation at Vacoas in December. Early spraying trials with Zineb at Arsenal and Reduit for the purpose of assessing both the control of leaf damage by the rusts and loss of yield throughout the season were ruined by the cyclones.

Onions—Garlic—Leeks

291. Nematodes associated with patches of dwarfed onion and garlic in beds were identified by the Commonwealth Bureau of Helminthology as saprophytic species. Root knot nematode may be responsible but no root material was despatched. A pink discoloration of diseased roots was also noted.

Tomato and Pomme d'Amour

292. *Stemphylium* is a more important disease than late blight in the drier localities where most of the commercial pomme d'amour is grown and powdery mildew is also of some importance. A palm tree effect due to russetting and blighting of the foliage was due to a mite *(Vasates lycopersicae)*. In an observation trial at Richelieu Zineb was effective against late blight and *Stemphylium*, whereas Soltosan and Cuprolylt were effective against late blight only. Karathane was effective against powdery mildew, the karathane plot being much greener than the controls of the Dimecron plot, which indicated little mite infestation. In a four replicate variety trial at Barkly in the absence of bacterial wilt, but in presence of late blight, *Stemphylium*, red spider and other mites, staked pomme d'amour and Marglobe gave lower yields than Oxheart, Western Red and an experimental variety from the U.S.A. In a four replicate variety trial for resistance to bacterial wilt at Reduit, pomme d'amour, Marglobe and Raisin went down completely with bacterial wilt before any fruit matured whereas three selections from North Carolina State College stood up very well. Soil sterilisation with vapam against bacterial wilt for tomato growing in tins was satisfactory. Root knot nematode shortened the bearing life of pomme d'amour especially in coastal sandy soils.

Ginger

293. Ginger plantations suffered considerably from the cyclones and drought. There was no special disease condition besides the usual bacterial wilt and scale insect damage.

Groundnut

294. In a trial comprising 13 varieties and 4 replicates, the local variety Cabri, which is moderately resistant to bacterial wilt, was outyielded by several new varieties under high wilt incidence at Reduit. A 77 variety observation plot was scored for bacterial wilt and *Cercospora* spp. leaf spot under average disease incidence. At Pamplemousses the first leaf spots on Cabri were noted on the 6th September and by the end of the month defoliation was considerable.

Sweet Potato

295. A mosaic type pattern on the leaves of the ' Yellow ' variety, an unidentified leaf spot on No. 16, South Queen and Raisin and a stem rot with an *Alternaria* sp. in association on ' Yellow ' were noted in the variety collection at Reduit.

Beans

296. Halo-blight was prevalent even under drought conditions. A halo-blight free stock-seed-plot of Victory beans was raised by wide spacing, rogueing and spraying with a copper fungicide at Barkly, while the remainder of the terrace sown in drills had the usual infection. *Cercospora* leaf spot caused extensive defoliation at Arsenal in June. Rust started in July and was prevalent during the rest of the year.

Peas

297. In observation treatments, Bordeaux mixture was effective against *Ascochyta* spp and Karathane against powdery mildew. An undetermined wilt of nearly mature plants occurred at Reduit.

Pigeon Peas

298. Several varieties in a trial of recently introduced varieties went down badly with *Fusarium* wilt.

Other Vegetables

Brassicae

299. Downy mildew, white rust, black rot and bacterial leaf spot were common and fusarium yellows occurred on new varieties of cabbage. *Sclerotinia sclerotiorum* was present on seed bearers. *Alternaria* blight of inflorescence also caused appreciable damage.

Carrot

300. A blight of carrot so far only recorded at Arsenal where it has caused appreciable damage since 1958 was due to *Cercospora carotae* (Passer) Kahn and Siem.

Chillies

301. Powdery mildew, causing yellowing, defoliation and reduction in size of successive flushes of leaves, restricted yields and kept prices of both the small and long hot chillies high during the winter. With the summer, and young plantations coming into bearing, prices dropped but the disease was still very obvious. Control with Karathane and Phaltan are being tried. *Cercospora unamunoi* was seen to affect the long hot and the dwarf small chillies as well as the green sweet peppers.

Cucurbits

302. A fruit rot especially severe on a white ' citrouille ' was caused by a *Phyllosticta* sp. and an *Ascochyta* sp. in association. A leaf spot of bitter gourd particularly affecting the ' giant ' type was identified as *Phyllosticta momordica* F. Tassi. Karathane gave better control of powdery mildew of ' patisson ' than Phaltan.

Egg Plant

303. Powdery mildew *(Leveillula taurica* (Lev.) Arnaud) causing defoliation and reduction in size of leaves of egg plant and anghive *(Solanum macrocarpum* L.), was a new host record for Mauritius.

In a four replicate variety trial at Pamplemousses and Reduit, for bacterial wilt resistance, Kopek, Motale and a local variety survived, while Rosita, ' Farcie ' and Yates Supreme went down completely with wilt before yielding any fruit.

Lettuce

304. There was no control of *Sclerotinia sclerotiorum* with soil treatment at three concentrations and one dusting of Botrilex (20 per cent PCNB.) in a trial on ' mignonette ' seed bearers at Barkly. The disease appeared to spread by contact due to too close spacing in the beds. More frequent dusting may be effective in reducing aerial infection by the spores. There is some indication that drier conditions would reduce the incidence of the disease.

Fruit

Banana

305. Banana plantations were very poor after the cyclones with very obvious mosaic symptoms. Fruit was just coming back on the market towards the end of the year. Leaf spots were not common and certainly were not responsible for the lack of fruit.

Citrus

306. Canker increased at Labourdonnais after the cyclones but dropped to normal towards the end of the year following the application of copper sprays. There was no severe ' gummosis ' in spite of considerable collar abrasions. Chlorosis and deficiency symptoms were connected with water-logged conditions or too deep planting, and yielded to corrective sprayings. A dwarf lemon easily raised from seed and suitable for potting seemed to be free from most of the citrus diseases which caused the extinction of other citrus varieties in Mauritius.

Pineapple

307. A brown discoloration of the flesh may be due to boron deficiency.

Ornamentals

Roses

308. Black spot and powdery mildew of roses were effectively controlled with Phaltan sprays.

Major Diseases

309. Bacterial wilt *(Pseudomonas solanacearum)* was particularly severe and widespread owing to flooding during the cyclones. However, in localities like Richelieu where it had not been observed for several years it was seen on egg plant soon after the cyclones; later it was seen only on potatoes on which it may have been seed borne, while tobacco, tomato and egg plant were not affected. In some localities growers in desperation tried various treatments including drenches of lime sulphur and lime for which they claimed some success. Examination of some of the ' cured ' plants, however, showed the bacterium in the tissues; colder conditions may have inhibited toxin production and matured tissue seemed to be tolerant while younger plants collapsed. It is noteworthy that at Arsenal, plots which had received considerable additions of coral sand showed no bacterial wilt on potatoes while other plots showed severe wilt on tomato and egg plant. Soil amendment with coral sand should be investigated further. Bacterial wilt is one of the most important plant diseases in Mauritius and so far soil treatment in the field is not practicable. Resistance to the disease is the only solution. Resistant varieties of tomato and egg plant are under trial while the King George potato variety and the groundnut variety Cabri have been long favoured because of some degree of resistance.

Miscellaneous Diseases and Fungi

310. The following were recorded for the first time in 1960:—

On *Abrus precatorius*—rust: *Dicheirinia trispora* Cummins.

Acanthospermum hispidum: *Phleospora* sp.; *Cercospora bidentis* Thorp.

Apple — dieback: *Dothiorella mali* Ell. & Ev.

Aster — *Stemphylium solani* Weber.; *Cercospora* sp.

Banana — leaf spot: *Deightonieilla torulosa* (Syd.) M. B. Ellis.

Breadfruit — leaf spot: *Phyllosticta* sp.

Cabbage — leaf spot: *Septoria* sp.

leaf spot: *Phyllosticta brassicae* (Curr.) Went

leaf spot: *Pseudoplea trifolii* (Rostr.) Petrak

rot : *Sclerotinia sclerotiorum* (Lib.) de Bary.

Calocasia — blight: *Cladosporium calocasiae* Sawada.

Camellia sp.: *Mycosphaerella* sp.

Cercoseptoria theae (Cavara) Curzi

Carrot — blight: *Cercospora carotae* Passer, Kazm & Siem.

Chrysanthemun — rust: *Puccinia chrysanthemi* Roze

Coconut — *Leptrostomaceae* indet. (From Rodriguez).

Codiacum — leaf spot: *Glomerella cingulata* (Stonem.) Spauld & Shrenk,

leaf spot: *Gladosporium* sp.

On Cotton — rust: *Phakopsora gossypii* (Arth.) Hirats.f. (Rodrigues and Mauritius)

Dahlia — *Stemphylium solani* Weber

Cercospora grandissima Rangel.

Dianthus — Leaf spot: *Alternaria tenuissima* (Nees ex Fr.) Wiltshire

— Leaf spot: *Stemphylium solani* Weber.

root rot : *Phytophthora* sp.

Eggplant — mildew: *Leveillula taurica* Lev.

Eleusine indica — blight: *Cochliobolus nodulosus* Lutrell.

Eucalyptus sp. — leaf spot: *Phyllosticta extensa* Ell. & Ev.

Furcraea — *Botryodiplodia theobromae* Pat.

Ginger — *Phoma* sp.

Groundnuts — *Pleospora calvescens* (Fr.) Tul.

Hendersonia sp.

Guava — leaf spot — *Pestalotiopsis* sp.

Helianthus tuberosus — *Cercospora bidentis* Thorp.

Hydrocotyle bonariensis — *Septoria* sp. (S.spegazzinii Sacc.).

Impatiens balsamina — *Stemphylium solani* Weber (From Rodriguez).

Alternaria tenuissima (Nees ex Fr.) Wiltshire.

Jasminum — leaf spot: *Glomerella cingulata* (stonem) Spauld & Shrenk.

Lucerne — *Cercospora zebrina* Passer.

Momordica charantia — *Phyllosticta momordica* F. Tassi.

Oleander — *Cercospora nerii-indici* Yamamoto.
Onion — *Stemphylium solani* Weber (From Rodriguez).
Shaeropsis sp. (From Rodriguez).
Pandanus — leaf spot: *Cercospora* sp. n. (From Rodriguez).
Pawpaw — leaf spot: *Ascochyta* sp.
Pineapple — *Botryodiplodia theobromae* Pat.
Plantago lanceolata — *Cercospora plantaginis* Sacc.
Poinsettia sp. — dieback: *Dothiorella* sp.
Potato — Mildew: *Leveillula taurica* Lev.
Peach — *Sphaeropsis* sp. (From Rodriguez).
Rhubarb — leaf spot: *Glomerella cingulata* (Stonem) Spauld. and Shrenk.
Alternaria tenuissima (Nees ex Fr.) Wiltshire.
On *Sechium edule* — *Cicinnobolus cesatii* de Bary parasitic on Oidium sp.
Siegesbeckia orientalis: *Cladosporium* sp.
Solanum macrocarpum — mildew: *Leveillula taurica* Lev.
Sonchus sp. — leaf spot: *Septoria sonchifolia* Cooke (From Rodriguez)
Sorghum — *Cladosporium* sp.
Squash and pumpkin — fruit rot: *Ascochyta* sp. and *Phyllosticta* sp.
Tea — leaf spot: *Cylindrocladium macrosporum* Sherb
Tephrosia — blight: *Phyllosticta* sp.
Vigna — collar rot: *Corticium rolfsii* (Sacc.) Curzi.
Waterlily — leaf spot: *Cercospora nymphaeacea* Cooke and Ell.
Yam — leaf spot: *Phyllosticta* sp.

The following bacterial plant pathogens were recorded for the first time in 1960.

On *Canna* — wilt: *Pseudomonas solanacearum* (E. F. Sm.) E. F. Sm.
Vicia — wilt: *Pseudomonas solanacearum* (E. F. Sm.). E. F. Sm.
Begonia — leaf spot: *Xanthomonas* sp.
Hibiscus — leaf spot: *Pseudomonas* sp.
Pelargonium — *leafspot*: ?
Kalanchoe — blight: ?

Control of Plant Diseases

311. A guide and notes on the control of plant diseases was prepared by the Plant Pathologist and distributed to the staffs of the Extension Service and the Agricultural Division. A radio talk in French on the control of diseases of secondary crops in Mauritius was broadcast in October.

Plant Inspection at Customs and Air-Port—Quarantine

312. The erection of a fumigation plant consisting of two 40 cubic metre concrete vaults with ' Malet ' equipment for fumigation at atmospheric pressure was nearing completion and equipment for fumigation under plastic sheet has been received. The equipment is intended for fumigating fruit mainly with

methyl bromide, especially apples from Japan, and nursery material. The exportation of tomatoes to Seychelles, Rodrigues and the lesser Dependencies was prohibited under Proclamation No. 18 of 1960. Sugar cane from Rodrigues was intercepted on two occasions; appropriate posters were despatched for display in Rodrigues. The Cane Quarantine Greenhouse was damaged by the cyclones and the cane varieties undergoing quarantine were cut down when the weather deteriorated and the stools destroyed later. The Cane Quarantine Greenhouse is now filled to capacity with introductions from various sources. The Crittall Greenhouse used for quarantine of fodder grasses was completely wrecked by the first cyclone and the grasses were destroyed as a precautionary measure. Two strains of Pangola grass, Guatemala grass and Lucuntu grass and one sweet potato variety were released from post-quarantine greenhouse observation. Nadi Blue grass which was reintroduced from Kew and quarantined in an insectarium, was released following negative sugar cane mosaic tests, and a period of post-quarantine observation.

XIX. Entomology

The Giant Snail (*Achatina fulica* Bowdish) and its predator (*Euglandina rosea* Ferussac)

313. Laboratory breeding of the predaceous snail: *Euglandina rosea* Ferussac, the predator of the Giant African *Snail, Achatina fulica* Bowdish, showed it to be a promising line of control not only for *Achatina* but also for *Helix aspersa* Muller. Several batches of eggs were obtained but as a result of water entering the breeding room through damaged shutters during cyclone *'Alix'*, the eggs failed to hatch.

Breeding has shown that *Euglandina* can eat medium size *Achatina* at the rate of 6–7 a week.

A short colour film was made of breeding in the laboratory; an article is in preparation for publication and a press release concerning predator liberations was also made.

A survey of the liberation sites has shown that *Euglandina* survived the torrential rains which accompanied the cyclones. Living specimens were found at Reduit and Beau Bassin seven months after liberation. Young individuals were also collected at Reduit. It is now almost certain that this predaceous snail can adapt itself to local conditions and mass introduction is contemplated.

Fruit Flies

314. Orchard fruits were very scarce throughout the year. Surveys showed that *Ceratitis rosa* Karsch was still troublesome on peach and loquat. The various species of *Dacus* also caused much loss of cucurbits after the cyclones as a result of death of their parasites. Introductions from Hawaii, which were stopped just after the cyclones, were accelarated in June. A number of consignments was received in excellent condition and the parasites were liberated in the field.

315. The tomato fruitfly, *Pardalaspis cyanescens Bezzi*, was very troublesome in the North of the Island. Several thousands of the parasites *Syntomosphyrum indicum Silv.* were liberated and good results were reported by the Extension Service officers.

316. Work on the control of fruitflies by insecticides was continued. Dipterex (dimethyl-trichlorohydroxyethyl phosphonate) was constantly used by planters all over the island. Bait sprays with Malathion and Aldrin also yielded good results.

317. A new insecticide, Lebaycid (mercapto-phenyl thiophosphate) was tested against *Ceratitis* on peach and against *Pardalaspis* on tomato. Very promising results were obtained, the insecticide being toxic even to eggs. Further trials are in progress.

318. Phosdrin was tested against *Dacus* spp. on cucumber and other *Cucurbitaceae*. Good results were obtained, but as spray hazards are too great this insecticide is not recommended for general use.

Pests of Tea

319. The survey of the various pests of tea was continued. The phytophagous mites: *Hemitarsonemus latus* Banks and *Brevipalpus phoenicis* Geyskes caused some trouble at the Wooton Tea Experiment Station. The aphids, *Toxoptera aurantii* B. d. F and *Macrosiphum (Sitobion) africana* H.R.L., were also numerous on young plants in the upland regions. All these pests were successfully controlled with Rogor 40.

320. A new lepidopterous pest, *Tortrix dinota* Meyr. (Tortricidae), was also observed on tea. Adults were obtained after breeding in the laboratory and specimens have been sent to the Commonwealth Institute of Entomology for identification. Experiments have shown that secondary hosts are *Citrus nobilis* Lowr. (mandarinier) and *Ligustrum walkeri* Dene (Privet). The pest can be controlled with Orthodibrom 8 (dimethyl—1, 2 dibromo—2, 2 dichlomethyl phosphate).

The Coconut Beetle: *Oryctes rhinoceros L.*

321. The Manager of Diego Garcia has reported having seen attracted by light several specimens of *Plaesius javanus* Erichson and *Hololepta quadridentata,* the two parasites which were liberated in an attempt to control *Oryctes* in Diego.

322. The Entomologist paid a visit to the Seychelles and the Lesser Dependencies in the months of October and November. In the Island of Diego Garcia, colonies of the wasp *Scolia ruficornis* F. sent a few years earlier, were seen. Chemical control of adult beetles using B.H.C/fine sand mixtures in leaf axils has given excellent control in young palms.

Stomoxys nigra Macq.

323. Several experiments for stable fly control were carried out at the Curepipe Livestock Breeding Station and on the following estates: Mon Désert—Mon Trésor, St. Félix and Beau Séjour. The insecticides used were DDT + Diazinon, Baytex, Malathion and S.D.C. swingfog solutions P. 14 and L.P. 1525. It now remains for the various establishments to carry out routine spraying as fly populations were considerably reduced and the effects persisted 6–8 weeks after treatment. Fogging experiments using non-inflammable solutions are in progress.

Screening of Insecticides

324. Experiments with new insecticides were continued throughout the year. The following insecticides were tested: phosdrin, orthodibrom 8, lebaycid and baytex, metasystox (demeton methyl), sevin and murfotox 47. Experiments with new spreader-stickers were also run. Plyac, teenac and ortho spreader-sticker have been found remarkably good. Synthetic latex stickers have been found to be even better and PEPS will now probably replace the traditional wetters in use.

325. Phosdrin is an organophosphorus insecticide which can be used as an alternative to dimecron. It proved to be the only insecticide capable of controlling *Cryptophlebia peltastica Meyr.*, a stem miner of the Flamboyant (*Delonix regia* Bojer) and *Crocidolomia binotalis* Zell., a serious lepidopterous pest of cruciferous plants.

326. Ortho-dibrom 8 proved to be an outstanding insecticide against thirps on citrus, onion, chillies and dwarf pea.

327. Baytex (O,O,dimethyl O-4 methyl mercapto—3-methyl phenyl thiophosphate) is also an organophosphorus insecticide of low toxicity to mammals. It gave very good control against the stable fly, the house fly and also against fleas and bugs. It is very likely that it will replace malathion, DDT and Diazinon.

328. Lebaycid (mercapto-phenyl thiophosphate) is allied to Baytex. It gave good results against fruit flies particularly *Ceratitis rosa* Karsch on peach and *Pardalaspis cyanescens Bezzi* on tomato. Metasystox (demeton methyl) and Murfotox 47 have given good results against aphids. Further trials are in progress.

MISCELLANEOUS

329. The two cyclones caused a general upset in the insect population. Some important useful parasites were affected to a considerable extent and, as a result, some minor insect pests suddenly became a serious menace to crops. A case in point is the almost ubiquitous presence of *Lipaphis pseudobrassicae* Davis (Aphidoidea) on *Brassica pe-tsai* Bailey.

330. In a number of localities severe attacks by caterpillars of *Diaphana indica* Saun, a pyralid, were noticed. There was also a recrudescence of *Aspidiotus destructor* Signoret caused by the almost complete disappearance of the predatory ladybird, *Chilocorus nigritus* Muls. On *Delonix regia* Bojer, the flamboyant, *Cryptophlebia peltastica* Meyr. was particularly troublesome. This insect is also a serious pest of litchi fruits, and steps are now being taken to obtain parasites from the Commonwealth Institute of Biological Control. On *Cajanus cajan* Millsfs *Platyhedra gossypiella* Sound (Lepidoptera: Gelechiadae) was common. In addition, the following pests were noticed causing severe damage:—

(*a*) *Pericyma glaucinans Gn.* (Noctuidae) on *Delonix regia* Boj. Plants were completely defoliated.

(*b*) *Trichoptilus wahlbergi* Zell. (Pterophoridae) on *Ipomea batatas* Lam. (sweet potato).

(c) *Lecithocera effera* Meyr. (Gelechiadae) on *Ipomea batatas* Lam. Attacks were specially noticeable in Black River.

(d) *Crotopus punctum* F. (Col.Curculionidae) and *C.brachialis* Boh. on citrus, mango and orchard plants, camphor, maize.

(e) *Adoretus versutus* Har. (Col.Scarabaeidae) on *Rosa spp.* (Rose).

(f) *Papilio demodocus* Esper. on citrus plants.

(g) *Autopus thallasinus* Fbr. swarming on graminaceous weeds.

(h) *Homorocoryphus differens Serv.* Swarming on graminae.

(i) *Batocera rufomaculata* De Geer on mango trees. avocado and breadfruit.

(j) *Olenocampus bilobus* on *Ficus carica* L.

(k) *Prodenia litura* F. on tobacco and in vegetable gardens.

(l) *Heliothis armigera* Hb. on tobacco and carnation.

(m) *Gryllotalpa africana* P.B. in vegetable and flower-gardens.

(n) *Spodoptera cilium* Gn., a cutworm, on lawns.

(o) *Phoracantha semipunctata* F. on *Eucalyptus robusta* Smith

(p) *Plutella maculipennis* Curtis, on Cruciferae including watercress.

(q) *Crocidolomia binotalis* Zell. on cabbage and cauliflowers.

(r) *Aulacaspis cinnamoni* (Newst) on mango. *Chilocorus nigritus* Muls has been found to keep this pest under control.

(s) *Xyleborus* spp. on fallen and moribund trees.

(t) *Scirtothrips aurantii* Faure (Thripidae) on chillies and dwarf pea.

(u) *Plusia chalcites* Esper. on banana.

(v) *Macrosiphum (Sitobion) africana* H.R.L., a new aphid on tea.

331. One consignment of *Scolia oryctophaga* Coq. was sent to the Cocos (Keeling) Islands. Unfortunately the plane caught fire and the insects perished.

332. Two consignments of lizards *Phelsuma* sp. were sent to the Medical Research Council, London and arrived in excellent condition.

333. Two consignments of *Xanthopimpla stemmator* Thumb. and *X.citrina* Holmgr. were sent to Reunion for control of sugarcane borers.

334. A series of experiments were made to test the alleged tainting effects of systemics on tobacco. Samples of leaf were sent to the British American Tobacco in London. As a result Rogor 40 can now be used on tobacco, while other systemics such as dimecron, phosdrin and metasystox are being further investigated. Phosdrin and metasystox are specially useful against the leaf miner *Gnorimoschema operculella* Zell.

335. Numerous visits were paid by officers of the Division to planters and recommendations made on control measures of various insect pests. Several demonstrations were also made with motor sprayers, electrical misting apparatus and the swingfog machine.

336. The Entomologist gave a lecture to officers of the Extension Service on chemical control of pests with newly tested products. He also delivered 2 radio talks.

337. Ninety new identifications were made during the year. The most important are noted below:—

(a) *Thalassothemis marchali Ramb.* (Odonata) allotype ♀. This is a most interesting record as the female was unknown before.

(b) *Orthetrum icteromelas* Ris..(Odonata) — a new form or race and the species a new record for Mauritius.

(c) *Proctolaelaps hypudaei* (Oudemans) — Acarina on damp aloe fibre bags at the Government Sack factory.

(d) *Scirtothrips aurantii* Faure (Thripidae) on citrus, dwarf pea *(Pisum sativum* L.)

(e) *Pteronemobius* sp. (Orthoptera: Gryllidae)

(f) *Homorocoryphus nitidulus vicinus* Walk (Orthoptera: Tettigoniidae)

(g) *Ailopus rodericensis* Butl. (Orthoptera: Acrididae)

(h) *Exitianus* sp. (Hem: Cicadellidae)

(i) *Coelidia indicus* Walk. (Hem: Cicadellidae)

(j) *Arbela* sp. (Hem: Nabidae)

(k) *Physoderes* sp. (Hem: Reduviidae)

(l) *Rhyparochromus* sp. (Hem: Lygaeidae)

(m) *Pachybrachius* sp. (Hem: Lygaeidae)

(n) *Eumicromus timidus* Hag.(Neuroptera: Hemerobiidae)

(o) *Chimarra* sp. (Trichoptera)

(p) *Formosina lucens* de Meij. (Dip: Chloropidae)

(q) *Trypanea superdecora* Bezzi (Dip: Trypetidae)

(r) *Melanostoma automenes* Walk. (Dip: Syrphidae)

(s) *Ctenacroscelis* sp. (Dip: Tipulidae)

(t) *Aleuroglyphus ovatus* (Tropeau) (Acarina) ex wheat bran.

(u) *Lopholeucaspis cockerelli* (de Charm.) on *Vanda (Hem: Coccidae).*

(v) *Chaetosiphon fragaefolii* (Cockerell) on strawberry (Hem: Aphididae).

The Tetranychoid mites of the African continent have now been revised by Baker and Pritchard. The following is a list of new identifications:—

(a) *Petrobia moutiai* Baker and Pritchard on *Verbena bonariensis.*

(b) *Eutetranychus africanus* (Tucker) on citrus, peach loquat, etc. (formerly identified as *E. banksi* (McG) 16.

(c) *Eotetranychus ancora* Baker and Pritchard, on apple leaves.

(d) *Oligonychus coffeeae* (Nietner), on coffee and tea.

(e) *Oligonychus plegas* Baker & Pritchard, on coconut leaves.

(f) *Oligonychus tylus* Baker and Pritchard, an *Panicum.*

(g) *Oligonychus saccharinus* Baker and Pritchard, on sugar cane.

(h) *Tetranychus neocaledonicus* André, on peach and coconut (formerly identified as *T.cucurbitae* Rahman and Sapra).

(i) *Tetranychus macfarlanei* Baker and Pritchard, on bean, pumpkin, *Hibiscus*, etc.

(j) *Tetranychus evansi* Baker and Pritchard, on tomato, egg plant, etc. formerly identified as *T.marianae* (McG.).

(k) *Brevipalpus californicus* (Banks), on Cotoneaster.

(l) *Brevipalpus obovatus* Donnadieu, on *Verbena bonariensis*.

(m) *Phyllotetranychus romaini* Baker and Pritchard, on *Latania loddigesii*.

(n) *Vasates lycopersicae* (Massee), on tomato. A new pest identified by Mr. Macfarlane of the Commonwealth Institute of Entomology.

338. Lectures in Agricultural Entomology were delivered by the Entomologist to IInd year students at the College of Agriculture.

XX. Agricultural Chemistry

Analyses

339. Some 1,200 samples of various products were analysed during the year, the principal ones being the following:—

Foodstuffs

340. About a hundred samples were received from the Livestock Feed Factory and the Agricultural Division for the purpose of ascertaining whether they were up to standard for ration blending. All the samples analysed were found to comply with specifications.

Samples of prepared feeds were analysed with a view to ascertaining the efficiency of blending. From September, regular monthly checks were instituted on these lines for all the twelve different feeds prepared at the Feed Factory.

341. It is interesting to note that dried ' bambara ' (sea slugs) which is being fed to pigs proves to be an important source of protein, as shown by the following figures:—

	per cent
Moisture	13.5
Protein	59.6
Fat (Ether Extract) ...	0.9
Fibre	0.3
Ash (Minerals)	6.8

342. Some food products, namely ghee peanut oil, peanut cake, sea slugs were received from Rodrigues for assessment as regards quality. Of these the ghee was found to be excellent. The groundnut oil was not entirely satisfactory owing to its high acid value, this being in the range of 4.5—5. According to British Pharmacopoeia Standard, the acid value should not exceed 4.0 for edible groundnut. The groundnut cake, being obtained from undecorticated nuts was found to be of a low protein and high fibre content.

	per cent
Dry Matter	91.5
Protein	31.3
Ether Extract	8.9
Fibre	22.3

The protein and fibre contents for a typical cake obtained from decorticated nuts would be 40 per cent or above and not more than 7 per cent respectively.

343. Sea slugs are being used in Rodrigues for the feeding of pigs. One sample, preserved in brine, was received for analysis and showed the following:—

	per cent
Moisture	... 60
Protein	... 15.6
Ether Extract ...	... 0.22
Fibre	... 0.02
Ash	... 17.8

Fodder

344. The experiment started by the Animal Husbandry Officer relative to the type of fodder eaten by cows of small cowkeepers was continued and is still in progress.

345. Newly imported grasses were periodically analysed with a view to assessing their value under the local conditions, as fodder. The more promising ones are listed below:—

	Dry Matter%	*Protein % Dry Matter*
Digitaria Pentzii (Pangola Grass)	21.2	10.7
Chloris Gyana Endebess (Rhodes)	20.0	10.5
Chloris Gyana Mbarara (Grass)	22.8	10.6
Fataque Madagascar	27.8	7.0
Panicum Maximum Sigor	25.4	10.8

They all compare reasonably with *Setaria Sphacelata* (Dry Matter 15.8 per cent; Protein per cent Dry Matter 8.9) now established in the uplands.

Milk

346. The monthly check of the fat content of milk from Curepipe Livestock Station and Richelieu Experiment Station was continued. The following is the monthly average for Curepipe.

	Percentage Cows											
Fat content...	*Jan.*	*Feb.*	*Mar.*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Less than 4% fat ...	8.4	8.2	8.2	16	35	13	13	35	34	50	34	24
between 4% and 5% fat	70.0	63	63	70	60	63	70	56	63	50	60	68
Over 5% fat	21.6	28.8	28.8	14	5	24	17	9	3	0	6	8

The percentage cows giving over 5 per cent fat decreased gradually from July to October and then started to rise again. Except for the months of August and October, 4–5 per cent fat was given by 60 to 70 per cent of the cows. In October the fat level was the lowest, with 50 per cent of the cows giving less than 4 per cent fat, and 50 per cent between 4 and 5 per cent fat. The 5 per cent level was therefore not exceeded in October.

Soils

Signal Mountain Soil

347. Soil samples from the slope of the mountain were analysed. The following shows the low content of that soil in nitrogen.

Nitrogen per cent	*Carbon per cent*	*C/N*	*Available Phosphorus per cent*	*Available Potassium per cent*	*pH*
0.15	2.5	16	0.02	0.02	7.0

Barkly Soil

348. The Soil from the newly planted area at Barkly Gardens showed a normal C/N ratio and a pH about neutral.

Nitrogen per cent	*Carbon per cent*	*C/N*	*Available Phosphorus per cent*	*Available Potassium per cent*	*pH*
0.24	2.6	11	0.03	0.03	6.9

Palmar Soil

349. A section stretching from the ' Pas Géométriques ' to the inland boundary near the ' Puits des Hollandais ' was sampled. The contents of nitrogen (0.2 per cent) and of available potassium (0.01 per cent) were lower near the sea. Farther inland nitrogen reached a level of 0.4 per cent and potassium 0.4 per cent. The C/N ratio was around 12. Near the inland boundary the nitrogen was 0.26 per cent, and the C/N ratio 23. The soil was very deficient in available phosphorus. None was found. The pH was around 7.6.

Curepipe Soil

350. Soil from the newly planted areas of the experimental station was sampled down to a depth of 4 feet. The following results will illustrate the changes in the soil profile:—

Horizon	*Nitrogen per cent*	*Carbon per cent*	*C/N*	*Available Phosphorus per cent*	*Available Potassium per cent*	*pH*
A	0.006	2.9	483	0.003	0.01	5.3
B	0.002	1.0	500	0.002	0.004	5.3
C	0.001	0.7	539	0.001	0.012	5.3

The percentage of carbon was normal at the top and tended to be very low at the bottom. The percentage of nitrogen was very low, the C/N ratio being as high as 500 instead of a normal ratio of 12. The phosphorus content was low and constant throughout. The pH was constant and normal for the locality.

Silage

351. A large number of silage samples were analysed for pH, protein content, volatile and non-volatile acids, amino-acids, lactic acid and volatile bases. From the figures now available, apart from the pH and protein content no definite conclusion can be drawn as regards the chemical composition of a good silage under local conditions. The pH of the silage produced during the year from cane tops varied between 4.0 and 4.5.

XXI. Agricultural Engineering

Servicing of Departmental Machinery and Vehicles

352. The servicing and preventive maintenance of all vehicles, tractors and agricultural machinery of the Department, again formed the main part of the regular work of the Central Workshop. Service schedules and complete records of all work done were kept.

353. The following sevicings and repairs were carried out:—

Tractors	44
Vehicles	92
Other agricultural machines ...	26
Total ...	162

Other Work

(a) Assembly of 3 chaff cutters.

(b) Complete overhaul of 1 lorry.

(c) Complete dismantling of 1 Fiat OM 45 Tractor and a Land Rover.

(d) Reconditioning of: 1 hand and foot thresher
3 Maize Shellers
25 mason chisels

(e) Flattening and packing of 500 empty cement drums for use on farm buildings.

Local Fabrication of Equipment and Accessories

354. Apart from the routine fabrication of different items of equipment and accessories for the various Divisions of the Department and which included irrigation pipe fittings, seed dressers, signboards, etc., the Division made a considerable amount of building accessories for use at the Quarantine Station and on damaged buildings. These included a very large number of foundation and other bolts, steel brackets, supports and door hinges.

Installation and Reconditioning of Machinery

355. 3 complete irrigation pumps together with engine and all piping and accessories were installed and tested for various agricultural stations:—

1 Fumigation plant was installed at Fort George.

1 Weighbridge was erected at the Quarantine Station.

The two feed mixers received at the Livestock Feed Factory were installed and tested before being put to use for full scale production.

Various workshop equipment were received and installed at the Central Workshop.

All the 68 crates of tea machinery reconditioned last year at Rivière Dragon were damaged by rain as a result of the cyclones and had to be reconditioned once more.

Planning and Control of Departmental Building Work

356. The Division was responsible for the preparation of plans, costings and supervision of the erection of various buildings:—

The fumigation rooms at Fort George were completed and the equipment installed.

The transformation of the old stores of the Division into offices was delayed by cyclone damage, but both this work and the erection of the bagasse store are now completed.

The building of a new cow-byre was started at Palmar and is near completion.

Cyclone Reconstruction

357. The whole burden of cyclone reconstruction of all departmental buildings, except the College of Agriculture was borne by the Division. Not less than 98 structures of widely differing sizes and degrees of damage had to be tackled with a labour force limited by a very acute shortage of carpenters. The major structures that were more severely affected were the Richelieu Experimental Station and Palmar cow sheds, the Head Office, the offices and sheds of the Veterinary Division, the labourers' quarters and greenhouses at Reduit and the offices of the Tea Division and the duck houses at the Curepipe Experiment Station. In spite of the shortage of staff and artisans the bulk of this work is now nearly over.

Fencing at Palmar

358. The fencing off of over 200 acres of land at Palmar into paddocks, was started.

Animal Quarantine Station

359. A quarantine station covering about 20 acres was built at Fort George within a restricted time limit. This station which is now completed comprises the following:—1 dipping tank, 6 paddocks, 7 drinking troughs, 1 incinerator, 1 weighbridge, 6 cattle shelters, 1 litter shed, 2 loading ramps, 1 office and 15 gates.

A small paddock, complete with loading ramps and drinking trough, was also built outside the Roche Bois Abattoir.

Advisory Work

360. Technical advice was sought by various divisions prior to the placing of orders for a very wide variety of industrial and agricultural equipment.

Classes in Engineering Workshop Practice were held by the Agricultural Engineer for 3rd year students of the College of Agriculture.

Livestock Feed Factory

361. In spite of competition from imported stockfeeds, the sales of the factory again soared during the year and productive capacity was strained to the limit. For the first time, the finances of the Factory were included in the General Estimates under Appendix D.

Two new HOLLAND feed mixers were received from the United Kingdom and are helping to meet increased demand for feeds. Another horizontal mixer is also being built to step up production further.

The factory continued the manufacture of feeding stuffs for poultry, cattle (in loose and cube forms), pigs and race horses. The following raw materials were used:—maize, wheat bran, pollard, fish meal, meat meal, lucerne, oats, bone meal, groundnut cake, cottonseed cake, wheaten flour, wheat grain, cod liver oil, molasses, vitamin supplements, salt, minerals and antibiotics.

Many of these materials were supplied directly by overseas tenderers.

362. Ureated molasses containing 70 per cent molasses, 27 per cent bagasse, 3 per cent urea and trace of elements continued to be popular as a cheap cow and stag feed.

A richer type of ureated molasses, prepared from fine bagasse pitch and containing 20 per cent cotton seed cake, is being tried.

363. As part of the intensive campaign to encourage better feeding of stock, the prices of various feeds marketed by the factory were considerably reduced in September. This was made possible by a general lowering of the prices of raw materials and by an overall increase in the manufacturing efficiency. For instance poultry feed is sold at 22 cs and cow feed at 16½ cs per pound compared with 25 cs charged for imported feeds. The feeds prepared by the Livestock Feed Factory continued to gain in popularity and sales of pig and cow feeds in particular rose. Sales of cow cubes through a contractor also rose considerably.

364. 2,600 tons of various types of animal feeds were sold. As a result of increased sales the Rose Hill extension shop was found to be too cramped and new premises were secured at Rose Hill.

Manufacture of Yeast Tablets

365. Cheap yeast tablets were made from imported South African powder. 11 million tablets were made; 11.5 million tablets were sold to the Medical and Education Departments and 90,000 to the public. In order to popularise the use of these tablets by the public, they are being packed in imported tin containers.

Finance

366. The statement of revenue and expenses of the Livestock Feed Factory for the year is given in Appendix ' E '.

XXII. Fisheries

367. The Fisheries Branch was created as an auxiliary service of the Supplies Control Department at the beginning of 1943, when imported food supplies became scarce.

In 1947, the Branch was placed under the responsibility of the Director of Agriculture for budgetary purposes; it conserved a large degree of autonomy. The Branch has now been integrated with the Department of Agriculture and

functions as a division thereof. The duties of the division are to enforce the provisions of the law regulating fisheries in territorial waters and to study, recommend and implement such new measures as may be necessary for the protection of fish, for the improvement of efficiency of the industry and for the welfare of the fishing community.

Oyster Culture

368. The collectors installed during the second visit of Professeur Pierre Lubet in November–December 1959 did not suffer damage by the cyclones. At the end of 1960 the string collectors, all densely covered with one year oysters, where broken up and the oysters distributed for farming. New collectors have been placed at the beginning of the spawning season in November.

Construction of Fish Sheds

369. During the year three fish sheds were constructed at Grand Gaube, Cap Malheureux and Trou aux Biches.

Sea Fishing

370. Fishing in 1960 was adversely influenced by the cyclones of January and February. Of a total of 1,838 boats registered prior to ' Alix ', both cyclones caused the destruction of 293 boats and damaged 630 others. Thus about half of the fishermen did not have fishing craft available for most of the year. It is largely due to the immediate relief measures adopted by the Government after both cyclones that the return to normal conditions was in sight at the end of the year. These measures included free issues of planks and nails for the repair of damaged boats and loans for the construction of new ones.

Controlled Catch per Quarter (Tons)

371. The catch per quarter during 1960 is given below in comparison of average catches for the previous 9 years.

	Average 1951–1959	*1960*
1st Quarter	410.5	246.1
2nd Quarter	421.8	375.6
3rd Quarter	335.3	312.2
4th Quarter	434.5	434.3
Total ...	1,602.1	1,368.2

372. The catch of the net fisheries, which for the three preceding years had been affected by the application of the close season, was greater in 1960, owing largely to lesser competition from the traps and lines in the lagoon.

Year	*Catch* (Tons)	*% of Total controlled Catch*
1951–55	410	25.0
1956	372	22.5
1957	364	21.8
1958	319	19.7
1959	342	26.3
1960	418	30.6

373. The catch in respect of the various modes fishing was as follows:—

	Catch in Tons		
	Average 1951–1955	*Average 1956–1959*	*Catch 1960*
Nets	410	363	418
Basket traps ...	715	628	492
Lines	247	275	253
Octopii	238	219	177
Lobsters	27	28	18
Harpoon fish ...	—	7	10
TOTAL ...	1,637	1,520	1,368

374. The main lagoon species (Capitaine, Cordonniers, Rougets, Mullets, etc.), was 39 per cent of the total landings of fish, excluding octopii and lobsters. The monthly catches were affected by the weather conditions of the first quarter of the year. There are normally two minima, one in January, the other during the winter months when the trade winds gather strength. The percentage catches for each month are shown below:—

Months	*Average 1951–59*	*Year 1960*
January	7.4	4.7
February	8.8	6.8
March	9.4	6.4
April	9,3	10.4
May	9.4	9.5
June	7.6	7.5
July	7.7	7.6
August	6.4	8.2
September	6.8	7.1
October	7.4	9.1
November	8.9	9.2
December	10.9	13.6

RELIEF TO FISHERMEN

375. As already mentioned the Government approved the free issue of materials to fishermen for the repair of damaged boats and the replacement of destroyed basket traps. Through the agency of the various Fisheries Posts, some 138,000 bamboo rods, 20,000 feet of planks, 3,000 kg of galvanised nails and 15,000 lb of wire for traps were issued, representing a total expenditure of about Rs 41,000.

LOANS TO FISHERMEN

376. A scheme for the issue of loans for the construction of new boats was also started. Conditions are 2½ per cent interest and a minimum monthly refund of Rs 7 on a maximum authorized loan of Rs 500. At the end of the year under review Rs 123,000 had been paid out and a large number of new boats already built. The number of applications still outstanding is considerable and every effort is made to ensure that funds loaned are invested in the construction of boats. Refunds are collected monthly by the Fisheries Inspectors and are satisfactory.

Experiments in Long Lining

377. In view of the increasing number of fishermen who attempt to make a living from the exiguous fishing grounds, and of the poor results of bottom fishing offshore which had been encouraged by the granting of loans to pinnace owners for the purchase of marine engines. it was decided to experiment with tuna long lines. The object is to determine whether the 30–32 feet pinnaces in use locally could profitably turn to fishing of pelagic species. Equipment was received and experimental fishing started in the summer of 1959–60. The cyclones of January and February interrupted these experiments, which were resumed in November. At the end of the year the lines had been set eleven times. It was determined that a pinnace of the local type could carry two miles of line, which represents 67 hooks. Results are not encouraging, but the run of yellow fin tuna having been below normal in the summer of 1959–60 and shoals having reached our waters late at the end of 1960, it is perhaps premature to reach a definite conclusion.

Catches consisted of:—

14 Sharks
2 barracudas
6 tunnies
1 dorado
1 Snapper

The total number of baited hooks set amounted to 680 during the eleven fishings.

Detection of Fraud

378. The results of the control exercised by the Inspectorate of the Division are given below:—

Year	*Cases proseeuted*	*Convictions*	*Total of Contraventions*	*Total of fines*
				Rs
1953 ...	515	508	550	15,172 00
1954 ...	586	571	635	15,256 00
1955 ...	473	463	524	15,036 00
1956 ...	390	382	436	11,059 00
1957 ...	403	396	509	11,689 00
1958 ...	429	423	466	12,360 00
1959 ...	319	305	421	10.518 00
1960 ...	230	229	330	7,477 00

55 cases were pending at 31st December, 1960.

379. The types of contravention were as follows:—

Year	*Illegal Nets*	*Explosives*	*Others*
1953	129	16	370
1954	148	44	394
1955	110	54	309
1956	117	35	238
1957	101	30	272
1958	115	26	288
1959	83	40	196
1960	67	23	140

Fresh Water Fisheries

Development

380. The water supply channels to the various ponds at Curepipe Experiment Station were improved. Two 1/10th acre ponds were constructed at Richelieu Experiment Station. The object of these ponds is to assess the productivity of *Tilapia spp.* in conjunction with pigs and cattle in the warmer coastal areas. Better water control measures were installed in the ponds at Pamplemousses.

Investigations

381. The use of *Tilapia melanopleura* has been reduced to 10 per cent of any pond stocked. At this rate the fish is very useful in keeping the ponds clear of water weeds. The main burden of production is vested in the two more productive species—*T.nilotica* and *T.machrochir*. Various trials were laid down during 1960 to test productivity, breeding capacity, mono-sex culture, and fertilizer requirements. Unfortunately, owing to the heavy rains which fell during the two cyclones, results were inconclusive. The heavy rain washed out of the ponds most of the nutrients supplied at the time of stocking, and considerable losses were sustained. One pond carrying the three species in a proportion of 9: 9: 2 of *T. machrochir, T. nilotica* and *T. melanopleura* at a rate of 2,000 fingerlings per acre produced 730 lb of fish per acre, much lower than some previous recorded figures. The ponds were restocked with fish as soon as fingerlings were available.

XXIII. Rodrigues

382. Work on the development plan being carried out by the Department of Agriculture in Rodrigues continued. A plan to extend the project to 1965 was drawn up. This new plan follows the pattern of the old in providing for the construction of unit farms, the terracing of farm lands, the construction of storm drains and for the reafforestation of hilltops and of steep slopes. In addition it provides funds for irrigation equipment to be installed in the recently developed flat river estuaries, and for the creation of small family operated dairy farms on the Cattle Walk lands. Mixed farming will result in a reduction of food imports in the years to come and it is expected that the exports of pigs, cattle, onions and garlic will be noticeably increased. Ghee offers the possibility of becoming an appreciable export. If marketing can be established on sound principles and fishing developed, it is fair to forecast that the economy of Rodrigues will be greatly improved.

Production and Marketing

383. Production and marketing was a new line for expenditure in providing cattle and pig shipping corrals and weighing facilities and a grading house and store for crops such as onions, garlic and beans,

384. The M.V. Mauritius made 9 trips to Rodrigues and the stevedores manifest is quoted below for the main exports:—

Voyage No.	*Date*	*Cattle*	*Sheep and Goats*	*Crates of Fowls*	*Pigs*	*Onion Bags*	*Garlic Bags*	*Bean Bags*	*Acacia Seed Bags*	*Salt Fish Bales*	*Octopus Bales*
1	26. 1.60	106	881	61	232	—	1	4	486	201	134
2	31. 3.60	38	630	64	206	—	2	—	307	568	235
3	4. 5.60	24	609	38	140	—	—	—	382	273	214
4	22. 6.60	121	611	37	290	—	—	—	655	326	252
5	28. 7.60	64	533	42	410	—	—	26	426	143	146
6	31. 8.60	59	472	74	400	82	—	108	71	155	92
7	16.10.60	61	709	95	491	1,432	190	8	528	400	251
8	29.11.60	64	569	85	467	1,194	65	24	129	377	79
9	28.12.60	28	1,119	68	272	79	50	—	90	269	72
TOTAL		615	6,133	584	2,908	2,787	308	170	3,074	2,712	1,475
OR				35,000 fowls		232 tons	26 tons	14 tons	260 tons		

385. The approximate value of these main exports is:—

		Rs
615 cattle at Rs 200 each	=	123,000
6,123 sheep and goats at Rs 30 each	=	183,990
35,000 Poultry at Rs 4 each	=	140,000
2,908 pigs at Rs 90 each	=	261,720
232 tons onions at Rs 350 per ton	=	81,200
26 tons garlic at Rs 1,000 per ton	=	26,000
14 tons beans at Rs 1,200 per ton	=	16,800
260 tons acacia at Rs 400 per ton	=	104,000
2,712 bales fish at Rs. 90 each	=	244,080
1,475 bales octopus at Rs 120 each	=	177,000
TOTAL		1,357,790

386. Prices compared with those obtainable in Mauritius are low. Visiting traders' profits are high and these profits are not invested in Rodrigues as the traders are resident in Mauritius.

387. The importance of the fishing industry is apparent from the above figures.

LAND SETTLEMENT

388. The total number of farms which have been leased out since the start of the development is 1.724. Of this total 967 have paid rent and the other 757 have been registered and given time to pay. The total acreage of these farms is about 3,500 acres and leased lots vary in size from $\frac{1}{8}$ acre vegetable plots to 4 acre farms; annual rents range from Rs 5 per acre up to Rs 80 per acre. All this leased land has had conservation works on it or has been protected from flooding by large storm canals,

Experimental and Demonstration Plots

389. The ten demonstration farms scattered over the island continued to interest local farmers and the acceptance of the principle of mixed farming by them is well brought out by studying the sales of animals to farmers from the Government Breeding Centres:—

390. Sale of Animals

Year	Dairy Cattle		Pigs			Goats		Sheep
	Adult Female	Young Male	Adult Female	Young Male	Young Female	Young Female	Young Male	
1958	1	1	—	13	—	16	9	—
1959	7	3	—	35	5	1	20	7
1960	39	61	6	135	74	42	32	25
TOTAL ...	47	65	6	181	79	59	61	32

391. It is anticipated that 1961 and subsequent years will see a substantial increase in these sales and the increase in sources of manure, milk and cash to the peasent farmer is bound to increase his health and wealth and the fertility of his farm land.

Livestock Breeding Centres

392. Imports of cows from the Department in Mauritius enabled the stocking of the six breeding centres to reach a satisfactory level and it will soon be possible to meet the demand of the local farmers. The stocking at each centre at the close of the year was:—

Pigs

Centre	Adult Male	Adult Female	Young Male	Young Female	Total
Oyster Bay ...	4	6	4	11	25
St. Gabriel ...	2	14	19	13	48
Le Chou ...	1	9	13	24	47
Maréchal ...	1	10	17	10	38
Bay Topaze ...	1	4	10	28	43
Pt. Brulé ...	—	—	2	8	10
3 Sols	—	—	—	2	2
Latanier ...	—	—	—	2	2
Palissade ...	—	—	—	2	2
TOTAL ...	9	43	65	100	217

Dairy Cattle

Centre	Adult Male	Adult Female	Young Male	Young Female	Total
Oyster Bay ...	1	15	5	10	31
Malabar ...	2	21	2	25	50
Le Chou ...	1	14	3	27	45
St. Gabriel ...	1	19	8	17	45
Maréchal ...	1	25	8	18	52
Bay Topaze ...	2	19	6	17	44
Latanier ...	—	—	—	2	2
Palissade ...	—	—	—	2	2
TOTAL ...	8	113	32	118	271

Goats

Centre	Adult Male	Adult Female	Young Male	Young Female	Total
Oyster Bay ...	6	40	16	3	65

SHEEP

Centre	Adult Male	Adult Female	Young Male	Young Female	Total
Oyster Bay	2	3	4	9	18
Latanier	2	1	—	3	6
3 Sols	1	2	1	1	5
Palissade	6	4	2	6	18
Pt. Brule	1	1	2	1	5
TOTAL ...	12	11	9	20	52

TREE PLANTATIONS

393. The reafforestation programme continued satisfactorily. Shade trees were planted on 1,640 acres of the cattle walk. Species used were Tecoma (38,980), Mourouk (1,393), Badamier (115), Bois de Table (2,108), Pomgam (990) and Flamboyant (424). Also 234 acres of hill tops were planted with 271,092 seedlings. Species used were Filao (134,724), Eucalyptus (6,800), Tecoma (125,825), Pomgam (742), Lataniers (709), Bottle Brush (2,272) and Flamboyant (20). At the end of the year all reafforestation plantations, young and old, were in very good condition.

XXIV. Lesser Dependencies

394. The production of copra continued to be the main industry in the Chagos group of islands and Agalega. Most of this is exported to Mauritius where it is processed into edible oil, soap and poonac at the Innova factory. The production of copra in the dependencies can be developed, but yields are at present on the low side owing to the influence of a number of adverse factors especially insect pests.

395. 4 principal islands are concerned: Peros with a total area of 2,900 acres, Salomon 2,000 acres, Diego 6,000 acres, Agalega 6,000 acres, making a total of 16,900 acres. The average yield of copra per acre is in the region of 0.15 ton. This is capable of considerable improvement with improved methods of cultivation and pest control. The situation at present may be summed up in saying that Peros and Salomon may be expected to maintain an aggregate yield in the region of 6 million nuts per annum. Diego Garcia, potentially the most productive, has been the most severely attacked by the Rhinoceros beetle. Agalega is in fair condition and production should rise from an annual average of 3½ million nuts prior to 1960 to about 5 million.

396. In the course of the year the islands were visited by the Entomologist of the Department. This visit followed a previous one the year before. It is interesting and gratifying to be able to report that the position in regard to the Rhinoceros beetle appears to be improving above expectations as a result of the application of the control measures recommended the previous year and also the introduction and development of useful parasites. Also, there is evidence of disease attacking the larvae. It will, however, take several more years before the situation really improves to the extent that production could be considered to be on a sufficiently sound basis.

397. During the year attempts were made to introduce cattle of the milch type for acclimatisation to add to the small herd of Ongole cattle shipped to Diego as a pilot project at the end of last year. Full information in regard to the management of the cattle was sent at the same time and suitable mineral mixtures recommended to meet the acute mineral deficiencies known to exist in the soil of these dependencies. By the end of the year a number of the cattle sent over had failed to acclimatise and had died. Further efforts are being made to improve conditions of feeding which are considered at present to be the real solution to the trouble.

XXV. General

Missions

398. The Entomologist visited Diego Garcia and Agalega from 22nd October to 23rd November, to investigate the disease caused to coconut plantations by the Rhinoceros beetle.

399. The Director of Agriculture attended the Annual Conference in Réunion of the *Comité de Collaboration Agricole* Maurice—La Réunion—Madagascar.

APPENDICES

A. Staff

(as at 31st December)

Appointment	*Name*	*Remarks*
Director of Agriculture ...	M. N. Lucie-Smith, M.A., B.Sc. Agric. (Lond.), Dip. Agr. (Wye), D.I.C.T.A. (Trinidad)	Went on leave 18.7.60
Deputy Directors	G. A. North Coombes, O.B.E., B.Sc. Agr. (Read), Dip. Agr. (Maur.)	On leave 14.3.60 to 11.7.60 Ag. Director from 18.7.60
	M. D. ffrench-Mullen, D.I.C.T.A., A.I.C.T.A.	

Administrative and Finance Divisions

Appointment	*Name*	*Remarks*
Chief Finance Officer ...	Y. Aumeeruddy ...	up to 24.10.60
	L. Hennequin	assumed duty 25.10.60
Chief Executive Officer ...	R. S. Buguth	
In addition there are:—		
	3 Senior Executive Officers	
	5 Executive Officers	
	2 Higher Clerical Officers	
	14 Clerical Officers	
	1 Confidential Assistant	
	8 Typist/Stenographers	
	1 Librarian	

Agricultural Division

Appointment	*Name*	*Remarks*
Senior Agricultural Officers	W. A. Wright, B.Agr., Dip. Agr. Sc.(Cantab.), A.I.C.T.A.	Went on leave 13.11.60
	A. d'Emmerez de Charmoy, M.B.E., Dip. Agr. (Maur.)	Retired on pension 1.10.60
Supernumerary Senior Agricultural Officer	W. Smith, N.D.A., C.D.A., D.T.A. (Trinidad), N.D. Agr. E., A.M.I.B.A.E.	On contract—with effect from 5.10.59
Agronomists	L. A. Suzor, Dip. Agric. (Maur.)	
	K. Lutchmeenaraidoo, B.Sc. Agr. (Read.), Dip. Agr. (Maur.)	
Horticulturist	J. H. Julien, Dip Agr. (Maur.)	

Appointment	*Name*	*Remarks*
Agricultural Officers ...	P. Regnard	
	L. Moorlee, Dip. Agr. (Maur.)	
	J. Marot	
	I. Fakim, Dip. Agr. (Maur.)	
	M. Sooltangos, Dip. Agr. (Maur.)	
	D. Lalji	
	S. Moutia, B.Sc. (Hort.), Dip. Agr. Econ., Dip. Agr. (Maur.)	
	1 Vacancy	

In addition there are:—

18 Assistant Agricultural Officers	2 vacancies
1 Surveyor	
1 Assistant Surveyor	
8 Overseers Grade I	
10 Overseers Grade II	

Agricultural Chemistry Division

Appointment	*Name*	*Remarks*
Chemist	S. Belcourt, B.Sc. Dip. Agr. Sc. (Wales) Dip. Agr. (Maur.)	
Assistant Chemist	J. Pablot	

In addition there are:—

3 Scientific Assistants

Plant Pathology Division

Appointment	*Name*	*Remarks*
Plant Pathologist	L. Orieux, B.Sc. (Lond.), D.I.C.	
Assistant Plant Pathologist	S. Félix, Dip. Agr. (Maur.)	

In addition there are:—

2 Plant Inspectors
1 Scientific Asssistant

Central Board Division

Appointment	*Name*	*Remarks*
Registrar	S. Staub, A.R.T.C. (Glas.), A.M.I. Mech. E., Dip. Agr. (Maur.)	Ag. Deputy Director of Agriculture from 14.3.60 to 11.7.60 from 18.7.60
Assistant Registrar ...	P. J. Galea, Dip. Agr. (Maur.)	Ag. Registrar from 14.3.60 to 11.7.60, from 18.7.60
Accountant	J. G. Gnany, A.A.C.C.A.	
Senior Assistant Chemist ...	—	Vacant
Assistant Chemist	R. Thélémaque, Dip. Agr. (Maur.)	

In addition there are:—

1 Investigational Officer and Weighbridge Inspector	
3 Senior Test Chemists	1 vacancy
25 Test Chemists (crop only)	
25 Samplers (crop only)	

Agricultural College Division

Appointment	*Name*	*Remarks*
Principal	J. R. Lagesse, B.Sc. (Lond.)	
Lecturers	R. Latulipe, B.Sc. (Lond.)	
	B. Roy, B.Sc. Agr. (Wales) Dip. Agr. (Maur)	
	1 vacancy	
Assistant Lecturers and Laboratory Demonstrators	P. Guerandel, Dip. Agr. (Maur.)	
	R. Burrenchobay, B.Sc. (Edin.)	On Contract
	F. G. Carver, Dip. Agr. (Maur.)	

ENGINEERING DIVISION

Appointment	*Name*	*Remarks*
Agricultural Engineer ...	E. Limfat, M.Sc., A.M.I.B.A.E., B.Sc., A.C.G.I., A.M.I. Chem. E.	
Assistant Agricultural Engineer	M. Morad, Dip. Agr. (Maur.)	

In addition there are:—

1 Scientific Assistant ...
1 Supervisor, Yeast ... Factory and Maize Mill

ENTOMOLOGICAL DIVISION

Appointment	*Name*	*Remarks*
Entomologist	J. E. A. Orian, B.Sc., (Hon.) St. Andrews F.R.E.S., F.Z.S., Dip. Agr. (Maur.), R.A.C.	
Assistant Entomologist ...	Vacant	

In addition there is:—

1 Scientific Assistant ...

LIVESTOCK DIVISION

Appointment	*Name*	*Remarks*
Senior Veterinary Officer ...	A. Darné, F.R.C.V.S., Dip. Agr. (Maur.)	
Veterinary Officers ...	J. U. D. Shuja, M.R.C.V.S. 1 Vacancy	On leave 31.7.60
Animal Husbandry Officer	I. H. Proverbs, B.Sc. Agr., Animal Husbandry, M.Sc (Nutrition)	On Secondment from Nyasaland from 31.8.57
Laboratory Technologist ...	L. Webb, Dip. Bio (Lond.), A.I.M.L.T. (Lond.) M.I.B. (Lond.)	
Senior Stock Inspectors ...	W. Haddon ... ... C. Delaitre, B.Agr. (N.Z.)	On leave 31.7.60

In addition there are:—

1 Scientific Assistant
10 Stock Inspectors
18 Livestock Assistants

Tea Division

Appointment	*Name*	*Remarks*
Tea Officer	R. B. J. Deane ...	On leave 2.10.60
Assistant Tea Officer ...	D. N. Andrews	Ag. Tea Officer from 2.10.60
Agricultural Officer ...	A. Baissac, Dip Agr. (Maur.)	Acting Assistant Tea Officer from 2.10.60

In addition there are:—

2 Assistant Agricultural Officers	
3 Overseers Grade II ...	(1 seconded permanently to Midlands Estate)

Rodrigues Division

Appointment	*Name*	*Remarks*
Senior Agricultural Officer	P. L. Hotchin, O.B.E., B.Sc. Agr. (Leeds), D.T.A. (Trinidad)	
Agricultural Officer ...	A. E. Farla	On leave 7.8.60

In addition there are:—

2 Assistant Agricultural Officers	
1 Stock Inspector	
1 Overseer, Grade I ...	Vacant
8 Overseers, Grade II	
4 Clerical Assistants	

Fisheries Division

Appointment	*Name*	*Remarks*
Fisheries Officer	J. de B. Baissac, R.A.C.	
Chief Inspector	J. Momplé	

In addition there are:—

3 Inspectors	
3 Sub-Inspectors ...	1 vacancy
16 Head Guards ...	2 vacancies
36 Guards	

B. Composition of the Principal Boards and Committees

(i) Board of Agriculture, Fisheries and Natural Resources

Ex-officio Members

The Director of Agriculture—*Chairman*
The Conservator of Forests—*Vice Chairman*
A Deputy Financial Secretary

Members of the Legislative Council

The Honourable R. Rey
The Honourable K. Jagatsingh
Dr. the Honourable L. Teeluck
Dr. the Honourable L. R. Chaperon

Representatives of Millers

Dr. P. O. Wiehe, C.B.E.
Mr. Robert Doger de Spéville

Representatives of Planters

Mr. Maurice Martin
Mr. Hassam Nazroo

Representative of the Chamber of Agriculture

Mr. L. H. Garthwaite

The Board did not meet during the year.

(ii) Agricultural College Advisory Board

The Director of Agriculture—*Chairman*

Nominated by His Excellency the Governor

Dr. P. O. Wiehe, C.B.E. (replaced by Mr. J. R. Antoine 14.1. to 15.5.60)
The Honourable D. Napal, M.L.C.
Mrs. V. Teeluck

Nominated by the Chamber of Agriculture

Mr. R. Hein, Q.C., *Chevalier de la Légion d'Honneur*
Mr. M. de Nanclas

Nominated by the Société de Technologie Agricole et Sucrière

Mr. René Leclézio
Mr. P. de Sornay, *Officier de la Légion d'Honneur*

Nominated by the Association of Former Agricultural Students

Mr. René Noel

The Board held four meetings during the year.

(iii) Central Board

Mr. S. Marion, District Magistrate—*Chairman* (up to 6.10.60)
Mr. S. Mootoosamy District Magistrate (from 7.10.60)
Mr. Maxime Rey
Mr. F. North Coombes } Millers' representatives

Mr. Roland Ducler des Rauches
Mr. Rabindrah Ghurburrun } Large Planters' Representatives

Mr. M. Burrenchobay, M.B.E. (died on 30.10.60)
Mr. B. Mungroo (from 16.12.60)
Mr. J. Chundunsing } Small Planters' Representatives

The Board held twenty-five meetings during the year.

(iv) Tobacco Board

Ex-officio Members

The Director of Agriculture—*Chairman*
The Commissioner of Excise—*Vice Chairman*
The Accountant General or any officer of his Department deputed by him
The Agronomist or any officer of the Department of Agriculture nominated by the Director of Agriculture
The Manager, Tobacco Warehouse

Appointed by His Excellency the Governor

The Manager of the British American Tobacco Co. (Mauritius) Ltd., or his representative
The Managing Director of the Amalgamated Tobacco Corporation, or his representative
Mr. A. G. Rey
Mr. R. Ducler des Rauches
Mr. R. Ramchurn

The Board held fifteen meetings during the year.

(v) Land Settlement Advisory Committee

The Director of Agriculture or representative—*Chairman*
The Senior Agricultural Officer (Extension)
The Registrar of Co-operative Societies
The Civil Commissioner (North)
The Civil Commissioner (South)
The Civil Commissioner (Moka-Flacq)
The Civil Commissioner (Plaines Wilhems—Black River)
The Honourable R. Balgobin, M.L.C.
Mr. Hassam Nazroo
Mr. Hurruck Hoolsy

The Committee held four meetings during the year.

(vi) Tea Control Board

Ex-officio Members

The Director of Agriculture or a Deputy Director of Agriculture—*Chairman*

A Deputy Financial Secretary

Appointed by His Excellency the Governor

Mr. P. Boullé—representative of the Chamber of Agriculture

Mr. J. Pilot, Mr. L. Ramdin } Manufacturers' representatives

Mr. A. H. Maderbocus, Mr. M. Ramdin } Planters' representative

The Honourable V. Govinden, M.L.C., The Honourable A. Dahal, M.L.C., Mr. R. W. Knight } other appointed members

The Board held twelve meetings during the year.

C. Legislation

Ordinance No, 1 of 1960	:	The Cyclone and Drought Insurance Fund (Amendment) Ordinance, 1960.
Ordinance No. 31 of 1960	:	The Cyclone and Drought Insurance Fund (Amendment No. 2) Ordinance, 1960.
Ordinance No. 38 of 1960	:	The Tobacco Production and Marketing (Amendment) Ordinance, 1960.
Ordinance No. 49 of 1960	:	The Sugar Industry Reserve Funds (Amendment) Ordinance, 1960.
Ordinance No. 53 of 1960	:	The Tobacco (Consolidation) (Amendment) Ordinance, 1960.
Ordinance No. 58 of 1960	:	The Fisheries (Amendment) Ordinance, 1960.
Ordinance No. 61 of 1960	:	The Sack Factory (Amendment) Ordinance, 1960.
Proclamation No. 2 of 1960	:	To fix the day of the coming into force of the Tea Industry Control Ordinance, 1959.
Proclamation No. 13 of 1960	:	To amend Proclamation No. 5 of 1956.
Proclamation No. 18 of 1960	:	To prohibit the exportation of Tomato Plant and Fruit to Seychelles, Rodrigues and the Lesser Dependencies of Mauritius.
Proclamation No. 25 of 1960	:	To authorise the use of Large Nets for fishing during the period extending from the 1st October, 1960 to 31st January, 1961.
Government Notice No. 4 of 1960	:	Order made by the Governor in Council under Section 7 (2) of the Minimum Wages Ordinance, 1950.
Government Notice No, 7 of 1960	:	Regulations made by the Governor in Council under the Tea Industry Control Ordinance, 1949.
Government Notice No. 24 of 1960	:	The Cyclone and Drought Insurance Fund, Ordinance, 1957.
Government Notice No. 31 of 1960	:	The Civil Establishment Ordinance, 1954.
Government Notice No. 33 of 1960	:	do. do.
Government Notice No. 65 of 1960	:	Order made by the Governor in Council under Section 7 (2) of the Minimum Wages Ordinance 1950.
Government Notice No. 77 of 1960	:	Regulations made by the Minister under Section 16 of the Tea Industry Control Ordinance, 1959, and Section 37 of the Interpretation and General Clauses Ordinance, 1957.
Government Notice No. 93 of 1960	:	The Civil Establishment Ordinance, 1954.

D. List of Publications and contributions to Literature by Officers of the Department of Agriculture during 1960

Name of Author	*Title of Paper*	*Name, Volume No. Page Nos. of periodical in which published*
North Coombes, A. ...	Les possibilités de l'ostréiculture à Maurice	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 1, pp. 15–17
Félix, S.	A list of *CERCOSPORA* occurring in Mauritius with short notes on the newly recorded species of some economic importance	Revue Agricole et Sucrière de l'Ile Maurice Vol. 39, No. 1, pp. 9–14
Félix, S.	Some studies on a disease of tomato new to Mauritius	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 6, pp. 353–356
Orian, G.	La mélanose de la mangue ...	Revue Aricole et Sucrière de l'le Maurice, Vol. 39, No. 3, pp. 128–130
Orian, J. E. A. and Moutia, L. A.	Fruit flies *(TRYPETIDAE) of* economic importance in Mauritius	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 3, pp. 142–150
Orieux, L.	A Survey of tobacco diseases in Mauritius	Revue Agricole et Sucrière de l'le Maurice, Vol. 39, No. 2, pp. 92–98
North Cóombes, A. ...	Exposé succint des fonctions de nos services agricoles.	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 1, pp. 22–24.
North Coombes A. et d'Emmerez de Charmoy, A.	The production of food crops in Mauritius.	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 3, pp. 131–141.
Suzor, L, ...	Les succès obtenus en culture de tabac avec les moyens modernes.	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 6, pp. 364–366.
Wright, W. A.	The cultivation of the potato for the best results under local conditions.	Revue Agricole et Sucrière de l'Ile Maurice, Vol. 39, No. 6, pp. 361–363.

F. CONVERSION TABLE

1 Arpent	...	...	1.043 acres
1 Gaulette	...	...	10.6 feet
1 Metric ton	...	...	1,000 kilos
1 Long Ton	...	...	1,016 kilos
1 Kilo ...	...	...	1,000 grams
1 Pound avoirdupois		...	454 grams
1 Hundred weight ...		...	50,803 kilos
1 Cord	...	...	92.82 cubic feet
1 Imperial gallon ...		...	4.54 litres
1 Rupee	...	...	1/6 d. sterling.

E. Richelieu Livestock Feed Factory

Statement of Revenue and Expenses for the Year Ended 30th June 1960

Expenses			Rs c
Stock of materials on 1.7.59 :—			
raw materials	221,732 61		
less amount not paid in 1958/59	119,220 94	102,511 67	
Manufactured feeds		7,530 70	
Aloe bags		2,852 78	
			112,895 15
Purchases :—			
cotton seed cake	85,503 89		
poonac	37,811 25		
wheat bran	127,955 43		
oats	28,098 50		
maize	283,373 57		
meat meal	31,254 69		
fish meal	81,823 97		
pollard	55,546 06		
lucerne	75,543 41		
milk powder	6,121 55		
salt	300 00		
rice...	7,591 60		
wheaten flour	16,080 00		
molasses	13,556 81		
cod liver oil	7,943 01		
bone meal	8,998 37		
rennet casein whey powder ...	1,984 80		
groundnut cake	40,767 67		
lentils	5,887 00		
minerals	1,699 50		
antibiotic	1,263 60		
aloe bags	17,115 13		
		936,219 81	
Salaries of Clerk Extension shop ...		3,138 00	
Wages of men		48,083 30	
Insurance		357 25	
Rent of Extension Shop		1,570 00	
Electricity		4,841 57	
Travelling		842 27	
Motor spirit		1,007 64	
Maintenance of lorry		1,199 16	
Stores		2,762 79	
Crown Agents		3,344 62	
Railway		1,138 81	
Net Profit		17,017 30	
Total ...		1,134,417 67	

Revenue		Rs c
Sales of feeds		931,486 61
Transport by lorry, adjustment, refund of wages etc.		4,075 81
Stock of materials on 30.6.60		
raw materials	218,390 82	
less amount not paid in 1959/60 ...	30,524 67	
		187,866 15
Manufactured feeds		9,974 10
aloe bags	1,715 00	
less amount not paid in 1959/60 ...	700 00	
		1,015 00
Total ...		1,134,417 67

5813/11/61—630